THE PERSPECTIVE PLAN FOR TAMIL NADU

DEVELOPMENT THROUGH INDUSTRIES

REPORT OF THE TASK FORCE

ON

LARGE SCALE INDUSTRIES

1972-1984

STATE PLANNING COMMISSION

EZHILAGAM, MADRAS-5

[illegible]

NOVEMBER 1972

PLAN DOCUMENT No. 10

5/

THE PERSPECTIVE PLAN FOR TAMIL NADU

DEVELOPMENT THROUGH INDUSTRIES

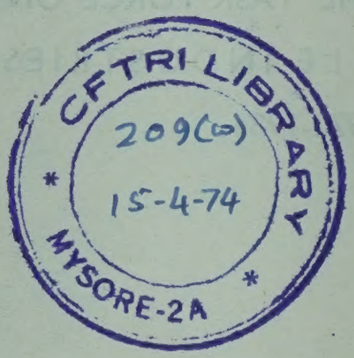
REPORT OF THE TASK FORCE ON LARGE SCALE INDUSTRIES 1972-1984

STATE PLANNING COMMISSION
EZHILAGAM, MADRAS-5

587C-59—A

November 1972, Planning Commission

XX:75.4411'N84 ← N72
L2



PRINTED AT GOVERNMENT PRESS, MADRAS-1

This report of the
Task Force on Large Industries sets forth
its recommendations on Large Industries and is not to be
taken as the Perspective Plan for that sector which the
Planning Commission will issue in 1973.

5870-59—A1

N. MAHALINGAM, B.SC., F.I.E.,
Member.

STATE PLANNING COMMISSION,
EZHILAGAM, MADRAS-5.

Dated: 20*th November* 1972.

MY DEAR CHAIRMAN,

SUBJECT: *State Planning Commission—Task Force on Large Industries—Final Report, Letter of transmittal for.*

I have the unique privilege to present to you the Report of the Task Force on Large Industries that was set up on 11th November 1971. The Report makes an attempt to assess on a perspective basis the scope and importance of developing established and new industries in the large scale sector with a view to imparting to the State's economy a new direction of development which will generate large employment and facilitate the achievement of the objective of doubling the standard of living by 1983–84 .

The Task Force has emphasised the need for according the highest priority for promoting agro-based and mineral-based industries besides expanding and diversifying the processing industries such as Petro-chemical, Electronic, Electrical and Mechanical Engineering industries.

The Task Force functioned in nine Working Groups and separate reports have been prepared under the guidance of experts on various subjects and an assessment has been made of the potential that exists for future growth on a defined basis. In spite of the limitation regarding the availability of data and the short time at the disposal of the various working groups commendable effort has been made to pin-point the attention of the Planning Commission on the immediate tasks and the desirability of briginging about balanced industrial growth and allocating larger share of available resources than ever before. I am firmly convinced that the State's economy is capable of strident growth in the perspective plan if only the financial allocations were liberal and there was a systematic strenthening of infrastructure facilities. It is this approach to the problems of industrial development concerning the State that has dictated the determination of a large outlay of Rs. 2,255 crores in the 12 year period in the State, Central, Joint, Co-operative and Private Sectors. I am sure, that given the proper priorities, the tasks ahead of us can be successfully fulfilled.

I am presenting this report on behalf of the Task Force on Large Industries. The Conveners of the nine working groups who spared no small pains to draft the report deserve special appreciation for their devotion and sincerity without which the report could not have been drafted within a short period of nine months.

The Members of the Committee of Coveners are :

1. Thiru C. N. Raghavan, I.A.S.,
2. Thiru A. S. Padmanabhan, I.A.S.,
3. Thiru M. K. Raju.
4. Thiru S. Ramaswamy.
5. Thiru N. Chandappa.
6. Thiru R. Veeraraghavan.
7. Thiru S. Subramaniam.
8. Thiru E. N. Naryanaswamy.
9. Thiru R. Arumugam.

Over a period of nine months, the Task Force worked both in plenary and Working Groups and incorporated in the report the considered views of the various experts.

I would like to express my profound gratitude to all members of the Task Force for their hard work, devotion and loyalty that have enabled me to present this report.

I wish to mention my heartfelt appreciation of Thiru C. S. Mahadevan, Secretary of the Task Force on Large Industries whose hard work and devotion have been responsible for the successful presentation of this report.

I remain at your service to furnish any further information on the Perspective Plan and to assist your goodself in any way that I may be called upon to contribute.

With kind regards,

Yours sincerely,

(N. MAHALINGAM)

To

Dr. Kalaignar M. Karunanidhi,
Chairman, State Planning Commission,
Fort St. George, Madras-9.

Copy to

Hon'ble Thiru S. Madhavan, B.COM., B.L.,
Minister for Industries,
Fort. St. George, Madras-9.

CONTENTS.

CHAPTER I.

General Introduction.

Page numbers.

Terms of reference—Members of the Task Force—Working Groups and their Members .. .. 1— 5

CHAPTER II.

Growth of Large Scale Industries in the State.

The position of Large Scale Industries in Tamil Nadu—Growth in selected industries between 1956 and 1971—Fourth Plan achievements—Central Sector Projects—Industrial Production in selected commodities .. 6— 9

CHAPTER III.

Infrastructure Facilities for large and medium industries.

Land—Water—Power—Communications .. .. 10—13

CHAPTER IV.

Raw materials and Finance.

Raw material for the Perspective Plan Period—Finance for large industries —Recommendations .. .. 14—19

CHAPTER V.

Metal-Based Industries.

Steel and Steel Products—Alloy Steel—Grey Iron Castings and Spun Pipes —Copper—Aluminium—Other non-ferrous metals based on lead, zinc, tin, etc., machine industry—Machine Tool Industry—Conclusion—Tables .. .. 20—30

CHAPTER VI.

Automobiles and Allied Industries.

Outlay for the Perspecuive Plan Period—Commercial Vehicles—Cars—Cycles—Tractors—Motor Cycles and Scooters—Auto-ancillaries—Tyres —General Recommendations—Tables .. .. 31—44

Chapter VII.

Page numbers.

Chemicals and Allied Industries.

Growth of the Industry—Man-made fibres Fertilizers—Petro-Chemicals—Petro-Chemicals in Tamil Nadu—Tyres—Pharmaceuticals—Scope for future Development of Chemicals and allied Industries—Recommendations—Tables .. .. 45—56

Chapter VIII.

Cement and allied Industries.

Cement—Ceramics—Whitewares—Demand for Whitewares—Setting up new units for whitewares—Ideal conditions—Crockery—Reveiw of performance—Production from 1968–70—Further Demand–Raw materials—Scope for the future—Ceramics—Crockery—Art Pottery—Refractories Technical Ceramics—Salt Glazed Stoneware pipes—Glass Products—Refractories in the State—Prospects for Refractories—Recommendations—Tables .. .. 57—70

Chapter IX.

Electrical Industries.

Introduction—General equipments—Transformers—Electric Motors—Switchgear and Motor Control Gear—Cables and Wires—Capacitors and Condensers—Insulating materials—Railway Electrification—Batteries—Electrical appliances—Lamps—Meters—Instruments and Relays—Transmission and distribution—Basic problems—Item-wise notes—Scope for future—Recommendations. ... ... 71—81

Chapter X.

Electronics.

Introduction—Primary Materials—Electronic components—Electronic equipment—Computers—Space research programme—Process Electronics—Electronic components—Electronic Test Instruments—Prospects for the future—Recommendations—Tables .. .. .. 82—99

Chapter XI.

Cotton Mill Industry.

Introduction—Past Plan Progress—Development of the industry in Tamil Nadu—Future Development—Demand Projections—Recommendations—Tables .. .. 100—111

Chapter XII.

Page numbers.

Handlooms.

Historical Background—Schemes and pattern of assistance—Production and Sales—Marketing—Handlooms outside co-operatives—Distribution of raw materials—Co-operative Spinning Mills Powerlooms—Exports of Handlooms—Focus for future—Recommendations—Tables .. 112—133

Chapter XIII.

Sugar Mill Industry.

Position of Sugar Mill Industry in the State—Cane Cultivation—Credit—Recommendations—Tables .. .. 134—141

Chapter XIV.

Paper Industry.

Present status—Production and Demand for Tamil Nadu—Projections for 1983–84 raw material—Recommendations—Capital Cost .. .. 142—148

Chapter XV.

Alcohol Industry.

Position—Requirements—Capacity—Future position .. .. .. 149—150

Chapter XVI.

Vanaspathi Industry.

Vanaspathi—All-India Production—Future position .. .. .. 151—152

Chapter XVII.

Rice Milling Industry.

Present position—All-India—Tamil Nadu—By-products—Broken rice—The Perspective—Tables .. .. 153—160

Chapter XVIII.

Fruit Processing.

Introduction—Tamil Nadu's position—Pine Apple—Bananas—Mangoes—Mango Porducts—Grapes, future prospects—General Recommendations. 161—170

Chapter XIX.

Page numbers.

The outlook for the Perspective Plan period.

Emphasis for the future—Infrastructure facilities—New and expansion schemes—Scope for sugar, cement, fertilizer and textiles—Central sector projects—Power and Water—Communications—Raw Materials—Resource mobilisation—Outlay for the 5th and 6th Plans .. .. 171—177

Chapter XX.

Special Recommendations.

Sugar Complex—Special facilities for textiles—Backward areas—Captive power units—Stock yards—Transport—Sub-contracting of know-how technical experts for administration of units—Joint sector projects in other countries—Techno economic surveys—Research—Water resources—Distribution system—Packaging—Labour policy .. .. .. 178—180

Appendix I.

Investment Portfolio. .. .. 180—184

Appendix II.

Districts in Tamil Nadu—Resources, Infrastructure and Industries .. 185—212

Appendix III.

Ancillary Industries in Tamil Nadu. .. .. 213—218

CHAPTER I.

(1) General Introduction.

The Indian Constitution lays down certain directive principles of State policy enjoying the State to undertake within its means a number of welfare measures intended to assure the citizens adequate means of livelihood, rise in the standard of living, improvement to public health, provide free and compulsory education for children and assure that the operation of the economic system does not result in the concentration of wealth and means of production to the detriment of the common good. In pursuance of these objectives, the Government of Tamil Nadu undertook planned development in the State through the various Five-Year Plans and Annual Plans.

1.2 In order to help Government implement its policies effectively by more efficient utilisation of the material, capital and human resources within the State and outside, a State Planning Commission was constituted. The most important work of the Planning Commission is to draft a Perspective Plan covering the decade, 1974–84 which will drawup an estimate of the investments needed in various fields of economic activity to achieve the desired target of rate of growth. These investments will cover the private and public sectors, the Central and the State Governments, the co-operative sector and various Development Corporations. The Perspective Plan will spell out the resources required in terms of man-power, materials and equipment besides finance needed to implement the programmes. Further, it will discuss and place before the Government for their consideration alternative strategies to achieve the goals of growth. Such alternatives will include, for instance heavy relative importance to be accorded to industry or to agriculture, small industry or to heavy industry. Also, the Perspective Plan will indicate in terms of broad orders of magnitudes the phasing of investments and benefits arising from adoption of different strategies. In short, the planning for the State will be based on an integral approach covering : (1) Sectoral profiles and long-term planning ; and (2) District Planning and data collection.

1.3 For Sectoral Profiles and long-term Planning, the State Planning Commission constituted 15 Task Forces with the following terms of reference :—

(1) the resources endowment ; the present pattern and intensity of its utilisation ;

(2) a critical review of programmes which have been implemented during the last two decades and their impact on production and productivity ; and

(3) directions of future development based on resources and needs which include the broad strategy of development and a complete inventory of ongoing projects as well as the shelf of new projects which are proposed to be taken up in future ;

(4) The Task Forces will spell out constraints to development also.

1.4 Of these Task Forces, the Task Force on Large Industries headed by Thiru N. Mahalingam, B. Sc., F.I.E., Member, State Planning Commission, was entrusted with the task of the preparation of the report for the industries in the large scale and medium scale sectors.

1.5 The following persons well versed in their various fields of activities, were nominated as members of the Task Force :—

CHAIRMAN—

1. Thiru N. Mahalingam, B. Sc., F.I.E.

MEMBERS—

2. Thiru V. Karthikeyan, I.A.S.
3. Thiru C. N. Raghavan, I.A.S.
4. Selvi M. S. Ramesh, I.A.S.
5. Thiru A. S. Padmanabhan, I.A.S.
6. Thiru K. Dharmarajan, I.A.S.
7. Thiru P. Shankar, I.A.S.
8. Thiru E. N. Narayanaswamy
9. Thiru V. Krishnamurthi
10. Thiru S. Subramanyam
11. Thiru A. Venkatesiah
12. Dr. G. S. Laddha
13. Thiru M. V. Arunachalam
14. Thiru R. V. Ramani
15. Thiru M. K. Raju.
16. Thiru K. S. Narayanan
17. Thiru S. Ramasamy
18. Thiru R. Viraraghavan
19. Thiru K. S. Ramasamy
20. Thiru K. N. Gopalan
21. Thiru R. Ratnam
22. Thiru C. R. Lingiah
23. Thiru K. Srinivasan
24. Thiru N. Chandappa
25. Thiru S. Nallaperumal
26. Thiru J. R. Ramanathan
27. Thiru R. Arumugam
28. Thiru N. V. Nayudu

SECRETARY—

29. Thiru C. S. Mahadevan

1.6 The Task Force was inaugurated on the 11th of November 1971 by Honourable Thiru S. Madhavan, Minister for Industries, Government of Tamil Nadu. While inaugurating the Task Force, the Honourable Minister hoped that the Task Force will help the Planning Commission in the various sectors of industrial development. He added that the steps that will be taken by the Planning Commission for the industrial development will go a long way to assist the State Government in formulating its industrial policy.

1.7 The Task Force then divided itself into eight Working Groups on the following basis :—

Name of the Working Group.	*Name of the Member.*
1. Agro-Industries	CONVENER—
	1. Thiru A. S. Padmanabhan, I.A.S.
	MEMBERS—
	2 Thiru A. Venkatesiah
	3 Thiru K. Madhava Sharma, I.A.S.
	4 Thiru K. S. Chandrasekaran, I. A. S.
	5 Thiru A. K. Vijayabhanu
	6 Thiru K. Fazullah Khan.
	7 Thiru N. Chandappa
	8 Thiru S. N. Lal.
	9 Thiru S. Viswanathan
	10 Thiru V. S. Tyagaraja Mudaliar
	11 Thiru T. M. Vittal
	12 Thiru I. Ponnuswamy.
	13 Thiru N. M. Shetty.
	14 Thiru S. M. Sulaiman
	15 Thiru K. Hanumantha Rao.
	16 Thiru J. Samuel Sundararaj.
2. Transportation—All industries associated with Transport and Automobiles.	CONVENER—
	1 Thiru M. K. Raju.
	MEMBERS—
	2 Thiru K. Dharmarajan, I.A.S.
	3 Thiru K. S. Ramasamy
	4 Thiru R. Ratnam
	5 Thiru K. V. Srinivasan
	6 Thiru J. Sahni
	7 Thiru V. R. V. Raghavan
	8 Thiru S. Viswanathan.
3. Chemicals—Organic, Inorganic, Petrochemicals Synthetic Fibres, Pharmaceuticals, Plastic and Dyes.	CONVENER—
	1 Thiru S. Ramaswamy
	MEMBERS—
	2 Dr. G. S. Laddha
	3 Thiru R. V. Ramani
	4 Thiru C. R. Linghiah
	5 Thiru T. R. Viswanathan
	6 Dr. P. P. Reddy.

Name of the Working Group.	*Name of the Members.*
4. Electrical and Electronics	CONVENER— 1 Thiru E. N. Narayanaswamy MEMBERS— 2 Thiru G. R. Damodaran 3 Thiru P. Obul Reddy 4 Prof. T. N. Seshadri 5 Thiru Kamalathiagarajan 6 Thiru V. S. V. Raghavan 7 Thiru A. N. Srinivasa Rao 8 Thiru M. Ragothama Rao 9 Dr. R. Subbayyan 10 Thiru T. V. A. Subramaniam 11 Thiru K. Guru Raja
5. Textiles	CONVENER— 1 Thiru R. Viraraghavan MEMBERS— 2 Thiru P. Shankar, I.A.S. 3 Thiru K. Srinivasan 4 Thiru N. P. Mogrelia 5 Thiru G. V. S. Desikan
6. Cement, Glass, Glass products, Clay products, Refractories and Ceramics.	CONVENER— 1 Thiru N. Chandappa MEMBERS— 2 Thiru K. S. Narayanan 3 Thiru P. S. Menon 4 Thiru B. V. Raju 5 Thiru P. C. Varshnei 6 Thiru S. Sathyanarayanan
7 Raw material, Finance and Infrastructure.	CONVENER— 1 Thiru C. N. Raghavan, I.A.S. MEMBERS— 2 Thiru N. Mahalingam, B. Sc., F.I.E. 3 Thiru K. Dharmarajan, I.A.S. 4 Selvi M. S. Ramesh, I.A.S. 5 Thiru C. S. Mahadevan 6 Thiru M. Vaidyanathan 7 Thiru G. Ramachandran 8 Thiru C. Siva Rao 9 Thiru M. R. Poonja

8 Metal-based Industries, Machinery and Machine tools.	CONVENER— 1 Thiru S. Subramanyam MEMBERS— 2 Thiru A. Venkatesiah 3 Thiru V. Krishnamurthy 4 Thiru D. Balasundaram, B.E. 5 Thiru K. Palanimanickam, B.E. Mech.

1.8 Later on, the Working Group on Handlooms with Thiru R. Arumugam, Joint Director of Handlooms and Textiles, as Convener and the following as Members was added :—

MEMBERS—

1 Thiru R. Kirubhakaran, I.A.S.
2 Thiru H. N. Satyanarayana
3 Thiru R. K. Raman
4 Thiru T. A. Kannappan
5 Thiru S. R. P. Ponnuswamy Chettiar
6 Thiru M. P. Nachimuthu Mudaliar
7 Thiru M. K. Swamy
8 Thiru P. R. Govindasamy
9 Thiru R. Viraraghavan

1.9 While the Task Force conducted five meetings the various Working Groups had periodical meetings and drafted their reports on the various areas of industries assigned to them.

1.10 The Task Force expresses its profound gratitude to all its members, non-officials and officials, Conveners of the various Working Groups, the experts on various subjects and the various Departments of the Government of Tamil Nadu, the IDBI, the IFCI, the TIIC, the SIPCOT and the TIDCO for the valuable assistance rendered by them in enabling it to draft its report.

1.11 The Task Force also would like to place on record the services rendered by its Chairman, Thiru N. Mahalingam, who has spared no small pains to attend the various meetings of the Working Groups as well as to participate in the discussions and to guide their proceedings at every stage of the preparation of the report.

1.12 Also, the Task Force would like to express its deep felt gratitude to the Union Ministry for Planning for having supplied it with the necessary reports for the various Working Groups concerned. It will be in conformity with the tradition if the Task Force expresses its grateful thanks to Thiru C. Ramdas, I. A. S., Secretary, State Planning Commission and Thiru K. A. Sundaram, I.A.S., Deputy Secretary, State Planning Commission, for having rendered valuable ministerial assistance during the course of the work.

1.13 The Task Force would like to place on record the services by Thiru C.S. Mahadevan, Secretary of the Task Force, who has been striving hard to go to various departments to collect information, conducting the meetings of the Working Groups and the Task Force and performing also the routine work of the administration of the Task Force during its period of tenure.

CHAPTER II.

1. *Growth of Large Scale Industries in the State.*

1.1 Till a few years ago, the only industry of importance in the State was Textiles, comprising largely of spinning mills. The industry is mostly concentrated in and around Coimbatore, though a few big mills exist in Madras, Madurai and other centres. The growth, expansion and diversification of different types of industries in the new lines of manufacture as well as in the production of many sophisticated items, have been one of the remarkable features in the industrial history of the State during the last decade and a half. Significant progress has been made on a wide range of industries—metal and metallurgical products, chemicals, agricultural and farm equipment, mechanical and electrical engineering goods, automobiles, railway coaches, etc. The number of industrial licences issued for industries other than textiles up to December 1970, bears eloquent testimony to the growth and diversification of the Industrial sector in the State. Industrial licences issued total 787 since the First Plan up to December 1970 and included 232 in the case of mechanical engineering industries, 121 for metallurgical industries, 106 for fertilizers and chemicals, 100 for agro-based industries and 228 for different enterprises such as paper, soaps, cement, timber products, etc. Both private sector as well as public undertakings have played a vital role in the industrial progress of the State.

1.2 The rapid growth achieved in the industrial front in the short-term will also be evident from the increase in company registrations. The number of new company registrations totalled 586 with a paid-up capital of Rs. 1,273 lakhs during the First Plan ; the number rose to 900, with the paid-up capital rising to as much as Rs. 11,655 lakhs in the course of the Second Plan and Third Plan.

2. Some important industries which have recorded impressive growth during 1956–71 are :

(*a*) Cement	Production has increased from 6·93 lakh tonnes to 27·99 lakh tonnes.
(*b*) Sugar	From 64,000 tonnes to 2·99 lakh tonnes.
(*c*) Motor cycles and scooters.	From 1,130 to over 10,428 units.
(*d*) Commercial vehicles ..	From about 1,000 over to 5,000 units.
(*e*) Cycles	From 1·30 lakhs to 4·5 lakh units.
(*f*) Automobile tyres ..	From 1·04 lakh tyres to 9 lakh tyres.

2.1 Some of the new products, which have made a mark on the industrial scene in the recent past are agricultural tractors, paper, castings (Steel and Cast Iron), forgings pipes and tubes, plastic manufactures, automobiles and cycle tubes and tyres, electrical and electronic items.

2.2 Among the various industrial enterprises in the State which have come up largely due to the efforts and initiative of private entrepreneurs, special mention has to be made of the chemical and aluminium industries complex in Mettur, the automobile and auto-ancillaries complex in and around Madras and foundry and electrical motor industries in Coimbatore.

3. The Fourth-Plan period recorded significant progress in the implementation of schemes for starting industrial units in the State Sector as the aggregate outlay is estimated at Rs. 17·45 crores against only Rs. 1·60 crores in the Third Plan. This is because the State Government started embarking on its own for the first time the development and the promotion of large-sized industrial units. The Continuous Casting Steel Plant at Arkonam has been completed in its first stage with an outlay of Rs. 8 crores, and the capacity is proposed to be doubled to one lakh tonnes of billets. The Alankulam Cement Plant with an initial capacity of one lakh tonnes is in operation and the capital cost so far is Rs. 4 crores. The capability of this unit is to be doubled first to 2 lakh tonnes and subsequently to 4 lakh tonnes annually. The modernisation of sick mills taken over by the Textile Corporation has made satisfactory progress and the Plan allocation of Rs. 2 crores has been found inadequate. The actual expenditure is likely to be Rs. 2·15 crores. No progress, could, however, be made in respect of salt-based industries, the sponge iron plant, machine tool projects and some other schemes ; but considerable preliminary work has been carried out and these projects along with expansion proposals of the Concast Plant and the Cement Plant will constitute spill-over schemes.

3.1 A very good beginning has, of course, been made with the formation of the Petro-Chemical Complex at Tuticorin, the giant fertilizer unit of SPIC which is a joint sector project and in which the TIDCO has a vital stay, is expected to be in operation almost by the end of the Fourth Five-Year Plan at a total cost of Rs. 73·5 crores. TIDCO has participated in the preference and equity capital of this undertaking to the extent of Rs. 5·25 crores. The aggregate amount utilised will thus be Rs. 27·80 crores as the case may be, against the allocation of Rs. 42·65 crores (Handlooms included) for the entire plan period. The shortfall is only notional as the funds ear-marked for the Salem Steel Plant were not untilised because it has been decided to implement the scheme in the Central Sector.

3·2 The allocation of Rs. 10 crores for Salem Steel Project has been largely unspent because it has been taken over by the Central Government in the Central Sector. The allocation of Rs. 5 crores by the TIIC has been utilised only for about 3 crores till now because expansion schemes only were implemented by the existing industrial units in private sector and there were not many new entirely industrial projects calling for sizeable assistance in the form of direct subscription to equity and preference shares and loans. Thus, the Fourth Plan has witnessed a significant beginning in respect of the joint sector for developing industries in the core sector while the State Government made a big entry in the industrial field by starting fully owned units. The Tamil Nadu Industrial Development Corporation and the State Industries Promotion Corporation are having numerous schemes on hand which will be implemented in the coming years. The latter organisation has also successfully encouraged the promotion of new industries in backward areas in the State.

4 *Large Scale Industries in the Public Sector—Central Government Industrial Undertakings.*

4.1 As at the end of the year 1969–70 the investment of the Central Government in its public sector undertakings in Tamil Nadu stood at more than Rs. 377 crores. These industries have an annual turnover of about Rs. 90 crores and employ about 50,000 persons. The undertakings are :—

(1) Neyveli Lignite Corporation Limited, Neyveli.
(2) Integral Coach Factory, Perambur, Madras.
(3) Surgical Instruments Plant, Nandambakkam, Madras.
(4) Hindustan Teleprinters Limited, Guindy, Madras.
(5) Hindustan Photo Films Manufacturing Company Limited, Ootacamund.
(6) High Pressure Boiler Plant, Tiruverambur, Tiruchirappalli.
(7) Madras Fertilizers Limited, Manali.
(8) Madras Refineries Limited, Manali.
(9) Heavy Vehicles Factory, Avadi, Madras.
(10) Ordnance Factory, Tiruchirappalli.
(11) Indian Oil Corporation Limited, Madras.

4.2 The Industrial undertakings in the Central Sector have been helpful in strengthening the regional economy and some units have expanded their activities considerably. The high pressure boiler plant at Tiruchirappalli has been steadily increasing its production and boilers of bigger capacities are being planned in order to meet new demands. The teleprinter unit in Madras has been functioning profitably and the teleprinters required for the export markets are being specially manufactured. The Neyveli Lignite Corporation is playing a pivotal role in power generation though due to technical and other difficulties, the full use is not being made of the thermal stations capacity, or the fertilizer units capability. There is urgent need for making arrangements for raising the output of lignite so that the integrated project can also make the full contribution in the shape of larger supplies of electricity, chemical fertilizer and lignite briquettes. The surgical instrument unit in Madras and the photo film unit at Ootacamund are also finding it difficult to use their capacity fully though latterly efforts have been made to overcome technical problems. The integral coach factory is of course doing good work and with the increasing demand for coaches of different types from the railways and the large export orders, the output is being raised continuously. The petro-chemical complex in Manali has made much headway in the current plan period. The Madras Oil Refinery has been functioning efficiently and efforts are being made to raise the throughput with the removal of bottlenecks in some directions. The Indian Oil Corporation has been constructing additional facilities at its installation for handling a larger volume of petroleum products while a blending plant has been established in the Manali Complex for producing different kinds of lubricants. The giant fertilizer unit in the same complex has got over with its teething troubles and after commencing commercial production in November 1971, the output of fertilizers has been rising substantially. The heavy vehicle

factory at Avadi is turning out tanks at the stipulated rate and there are also proposals for undertaking the production of other items of equipment. The Ordnance Factory at Tiruchirappalli is also meeting the requirements of the defence services in the form of rifles.

5. The diversified and the growing pattern of industrial production in the past decade will be evident from the details given in the following table :

INDUSTRIAL PRODUCTION IN SELECTED COMMODITIES.

(CALENDAR YEAR.)

Serial number and name of item.	*Unit.*	*Output in* 1961.	*Output in* 1971.	*Percentage increase in* 1971 *over* 1961.
(1)	(2)	(3)	(4)	(5)
1 Sugar	'000 tonnes	130	299	130·0
2 Hydrogenerated Oil (Vanaspathy)	Tonnes	12,790	21,852	70·8
3 Refined Oil	,,	6,145	9,660	57·2
4 Tea	,,	39,768	55,008	38·3
5 Coffee	,,	6,738	7,524	11·7
6 Cotton Yarn	'000 tonnes	128	160	25·0
7 Staple Fibre Yarn	Tonnes	6,459	25,944	01·7
8 Tyres (Giant and Cycles)	'000 Nos.	2,003	9,051	341·9
9 Superphosphate	Tonnes	102,004	143,940	41·1
10 Mixed Fertilizers	,,	82,334	93,540	13·6
11 Caustic Soda	,,	53,886	1,11,948	107·7
12 Safety Matches	'000 gross Boxes.	21,690	41,022	89·1
13 Refractories	Tonnes	42,414	123,516	191·2
14 Cement	'000 tonnes	1,187	2,799	135·8
15 Asbestos Cement Products	'00 tonnes	354	577	62·9
16 Grinding Wheels	Tonnes	854	3,444	303·3
17 Coated Abrasives	'00 Reams	660	847	28·3
18 Internal Combustion Engines	'00 Nos.	147	230	56·5
19 Typewriters	Nos.	4,363	10,272	135·4
20 Power Transformers	'000 Kva.	331	1,303	293·6
21 Electric Motors	'00 Nos.	278	1,030	270·6
22 Dry Cells	In lakhs	459	1,109	141·6
23 Motor Cycles	Nos.	4,682	10,428	122·7
24 Bicycles	'000 Nos.	276	345	25·0

5.1 As a result of the spectacular progress recorded in many directions in the past two decades, the State is now accounting for a significant share of All-India output in many directions and some industries have even acquired a stature which is truly impressive and a good base has been laid for achieving even faster growth in the coming years.

CHAPTER III.

Infrastructure facilities for Large and Medium Industries.

The provision of infrastructure facilities for large and medium industries would involve a study of the requirements of land, water and power for their developments in different regions. Indeed, they are the essential concomitants of industrial expansion. Water availability for industries, which consume large quantities, will become a problem in the next decade. Also, the shortage in required quantities of power for large and medium industries may act as a serious handicap if suitable measures are not taken. Hence, the perspective planning of Tamil Nadu will have to consider the urgent need for providing for the generation of power as well as for supplying water in adequate quantities. The position of these items of infrastructure for planned economic development may be examined in detail.

1. *Land.*

1.1 The preparation of suitable land-sites, for promoting new industries, with the ready availability of other basic facilities, is very important as it will be possible to locate new industries on a dispersed basis. Considerable experience has already been acquired in developing industrial sites in the Ambattur and other areas. While industrial estates will take care of the requirements of small and ancillary industries, some new schemes will have to be formulated for developing industrial plots for large industries.

Land for Large Industries.

1.2. Special attention will have to be given for the dispersal of industries. The development of land sites will depend much on the availability of water for different industries. Considerable field work will have to be done for developing sizable blocks as has been done in Maharashtra. Large areas will have to be acquired much ahead of actual needs and the Government should allot large chunks out of their own lands.

1.3. In this context, it is necessary for us to examine the adoption of self-financing schemes. A distance of 25 miles from Madras City on the Madras-Chingleput National Highway and a similar distance of 25 miles on the Tiruchirappalli-Villupuram National Highway can be thought of as areas for the provision of land as developed plots for large and medium industries to be set up in the private sector.

1.4. Each such Industrial plot, consisting of 30 medium sized industries, with an area of 20 acres for each industry, together with a provision of 200 acres for house-sites, will require about 800 acres of land. Depending upon the geographical location of the existing town or Panchayat, the developed areas can be constituted at intervals on either side of the National Highway. For the stretch of 25 miles on Tiruchirappalli-Villupuram route and another 25 miles from Madras-Villupuram route, there would be ultimately 10 developed plots, 5 on either side of the National Highway.

1.5. The land required for the purpose has to be provided in a block and it can be secured at Rs. 2,000 per acre. The cost of land development, including provision of roads, water-supply and electricity can be met from the resources raised by sale of the developed sites. In order to convert about 8,000 acres into ten developed plots, we have to spend about Rs. 12 crores. If these 8,000 acres are re-sold to industrialists at the rate of Rs. 15,000 per acre, it will raise resources to the extent of Rs. 12 crores. If the scheme is distributed over a period of 10 years the cost per year will come to about Rs. 1·2 crores. Other areas in different parts of the State will have to be similarly developed in order that 10 to 15 new complexes can be established. The character of these complexes will depend on the availability of water and access to raw material supplies.

1.6. The power needs of these industrial estates which may be of the order of 1,000 Mega Watts can be met from suitably located coal based thermal stations, besides expanding the capacity of the Kalpakkam Atomic Power Station. In addition, the railway has to be converted into broad guage to ensure quick movement of raw materials and finished goods. The Railway Ministry has already considered favourably the provision of broad guage facilities from Karur to Tuticorin in future schemes. These facilities will have to be extended to other important routes, the eventual objective being to have only one uniform broad guage system.

2. *Water.*

2.1 The supply of water for industrial purpose has not so far presented any serious problem because of the utilisation of river waters and wells, sunk in river beds or adjoining areas. But the requirements are increasing at such a fast rate that the tapping of underground water resource has to be attempted in some areas and a good beginning has already been made in North Madras for meeting the needs of the Manali-Petro-Chemical Complex. In Neyveli, nature has been helpful as abundant underground water resources are available. There is also compulsion to pump out water from these reserves which is helpful for meeting the needs of the thermal station, and other industrial units apart from that of the township. The location of new water consuming industries cannot be thought of in the coming years on the river banks as there is already complaint about pollution and shortage. The effluents have to be carefully treated before being discharged as otherwise they will harm agriculture.

2.2. A systematic survey has to be carried out in new areas for determining sources of underground water resources. Paper, cement, heavy chemicals, steel and other industries will call for large quantities of water. On a rough estimate, 150 million gallons daily may be required for the new industries in Salem, Tuticorin, Coimbatore, Tiruchirappalli, Madras and other complexes. It should even be stipulated that the existing cement units should change over to the dry process wherever possible for conserving water resources. As in the case of irrigation, efforts should also be made to secure supplies from adjoining areas. Kerala might be requested to come to the help of Coimbatore not only for supplying water for drinking purposes but also for industrial purposes. The arrangements with Andhra Pardesh should also take into account the needs of industries in Madras, North Arcot and Chingleput districts. For South Arcot, Thanjavur and Tiruchirappalli, the water released as a result of modernisation of the existing irrigation system and the

construction of new barrages in new places should be helpful. Tirunelveli and Ramanathapuram should also receive help from Kerala. A scientific approach is necessary. Otherwise, there will be a water famine in the Sixth Plan when the requirements will be 250 million gallons daily for industrial purposes alone.

2.3. Sea water cooling will have to be attempted wherever possible as it is proposed to be done at Kalpakkam while with further research work on desalinisation suitable water for industrial purpose should be produced. While salt made available through desalinisation will be helpful for the Manali and Tuticorin Complex, for the new Heavy Chemicals Plant and also for export, it may be agreed that the industrial units can afford to pay extra charges for their requirements of water.

3. *Power.*

3.1. The requirements of power for industrial development will increase at a faster rate in the next decade as power-intensive industries will be coming up. At present, fifty per cent of the total power generated is consumed by the different industries. This proportion should normally come down with increasing use of power for agricultural operations and by domestic consumers. It is unlikely, however, that the proportion will come down. On the other hand, it may be raised to 55 per cent, especially, as industries using power for many operations will come up in a big way and there will also be partial mechanisation of the handlooms besides the establishment of powerlooms.

3.2. Over nearly 2,500 Mega Watts of capacity will have to be created in 1974–79 and 5,000 Mega Watts of power in 1979–84 for both large and small industries. The industries, major and medium scale, will require 1,250 Mega Watts in the fifth Plan and 2,500 Mega Watts capacity in the sixth plan, thus making for a total capacity of 3,750 Mega Watts.

3.3. The Task Force recommends that :—

3.3.1. Greater attention may be paid for the location of Thermal Stations—coal based and nuclear from the point of view of availability of power to the steel, steel-based industries, heavy chemicals and electro-chemical industries. In view of the advisability of generating power by industrial units where steam processes are involved or other facilities exist, the feasibility of creating generating capacity should be fully exploited.

3.3.2. There will have to be a detailed study of power needs in collaboration with the Tamil Nadu Electricity Board as the main consumers will be the units manufacturing caustic soda, soda ash, heavy water, fertilizers, aluminium, calcium carbide, cement and smelters that may have to be created for producing copper and zinc, based on indigenous or imported concentrates.

3.3.3. The supply of adequate power for different power-intensive industries such as the electro-chemicals will have to receive the immediate attention of the Govern ment. The problem of power tariff will have to be gone into thoroughly and a separate urvey has to be conducted.

4. *Communications.*

4.1. The net-work of road-ways is already well-developed but the quality of the arterial road-ways and feeder roads will have to be improved by mecadamising the main roads wherever necessary. There may also have to be cement concrete, long stretches where heavy traffic is involved and the objective should be to link the main industrial centres with cement concrete roads. The bridges and culverts have to be strengthened to carry lorry loads upto even 30 tonnes as there is now difficulty in using heavy duty vehicles for moving bigger loads through commercial vehicles. There will be a trebling of freight traffic by road transport operators in the next plan and on a much large scale in the Sixth plan. The activities of the Railways also have to be co-ordinated and the disability now experienced in transhipment on account of break of gauge will have to be completely eliminated. While the construction of broad gauge line between Karur and Tuticorin will facilitate the movement of goods, the area between Tiruchirappalli and Madras will be severely handicapped and fresh problems may also crop up after the steel plant at Salem comes up and allied industries begin to take shape. There is no escape from converting the whole of metre Gauge system into broad gauge on a time-bound basis and the whole track between Madras and Tuticorin will have to be doubled besides extensive electrification. In view of these serious problems in moving coal from far removed mining areas and the inadvisability of using diesel-oil for long periods the whole of the Southern Railway must depend on electric traction.

4.2 The airport facilities have to be developed ambitiously besides opening up new centres to serve Tuticorin, Salem, Neyveli and Ulundurpet. Also, the Airports at Madras, Coimbatore, Tiruchirappalli will have to be equipped with the runways for handling bigger aircraft. It may also be necessary to create a duty-free-zone near the Madras Airport for facilitating the import of certain components, required for the development of Electronics Industry.

CHAPTER IV.

Raw Material and Finance.

1. *Raw Material for the Perspective Plan Period.*

1.1 The position in regard to agricultural and industrial raw material may get complicated during the ten year period as new demands of new dimensions will arise and the arrangements will have to be completed for regenerating on a continuing basis agricultural raw materials. The deficiencies in respect of minerals, steel and non-ferrous metals will have to be overcome with the development of mineral deposit, promotion of industries producing ferrous and non-ferrous metals and securing also from outside sources those quantities which cannot be produced regionally.

1.2 There will have to be a systematic approach to the question of augmenting supplies of sugercane for a near trebling of sugar production apart from meeting any increase in demand for Gur and Khandasari that may take place. In view of the scarcity of land with adequate irrigation facilities and underground water resources, the objective should be to raise not only the weight of cane per acre but also its sucrose content. It should be easily possible with the administration of inputs and cultivation of new varieties of cane to raise the sucrose yield per acre by 50 per cent from the persent level. There should, in any case, be no difficulty in ensuring adequacy in respect of cane supply for meeting the needs of sugar mills and Gur and Khandasari producers.

1.3 As regards raw cotton, there is already a deficiency for over 4 lakh bales and this deficit may increase to at least 7 lakh bales in the next 10 years with an expansion of spinning capacity of the textile industry. There will, thus, have to be a trebling of the output of cotton to one million bales which is not an impossibility. Even with the existing acreage, there can be doubling of the output as the latest developments indicate the distinct advance in agronomic practices and new strains also are being cultivated. The balance of 4 lakh bales can be raised by extending area under the crop which would mean that the acreage will have to be increased. Suitable lands, with the lift irrigation facilities in the new areas may be selected so that diversion from area under other crops can be avoided as far as possible.

1.4 There will, however, be shortages of wood pulp, staple fibre, rayon yarn and nylon filament yarn. As the efforts for producing rayon-grade pulp have been immensely successful, there will have to be systematic policy of plantation of soft-wood trees for providing the required raw materials. The forest areas in the State are not abundant but the existing land can be suitably exploited with the evolution of new policy with long-term objectives. Research work also has to be done for determining the suitability of bagasse for manufacture of cellulose film or other products with the pulp that could be secured with these raw materials. There will be technological problems but these will not be insuperable. If there are shortages of cellulosing fibre, as they are likely to be, pulp may be got from outside sources; but the processing plants should be located in the region. These will obviate the shortages of rayon yarn, staple fibre, polynosic and other cellulosic

fibre. Polyster fibre may not be in shortage for some time as the new unit can meet the requirements of the region and its capacity also suitably expanded wherever necessary. But there will have to be a large-sized unit for nylon filament yarn in the petro-chemical complex. Pending local manufacture, supplies will have to be secured from other States or imported. The paper industry will, of course, have to depend on an increasing measure on supplies of bagasse for its requirement of raw materials.

1.5 There is a serious shortage of steel, non-ferrous metals, coal, coke, ferro-manganese and other items. Even with the coming up of the Salem Steel Plant, which will not be before 1978–79, there will be no source of supply for mild steel except the quantities of billets that will be produced by concast plant at Arakonam. No precise quantification of requirements of steel is possible but having regard to the all-India consumption of 25 million tonnes of finished steel in 1983–84, Tamil Nadu alone may need over 2 million tonnes (1983–84) annually for feeding the metal-based industries and meeting the requirements for residential construction, irrigation, power-projects, etc. There will have to be dependence on outside States but with the coming into being of Visakapattinam and Vijayanagar project the position may not be very difficult in the VI Plan.

For the V Plan, the State Government will have to make arrangements with the Centre for securing a sizable quota besides making its own arrangements for maintaining banks in strategic locations. There will be no problem for iron-casting but additional facilities will have to be created for steel and non-ferrous casting. Coke has to be brought from outside sources as the consumption will increase substantially and it is also proposed to import coal for feeding the Salem Plant. It should be possible to have excess coke production with the batteries that may be established. A new battery may also be established in Madras for meeting these requirements of foundries and others. Coal will have to be brought regularly from West Bengal and Orissa and its consumption may be increased to over 3 million tonnes by 1978–79 and 5 million tonnes by 1983–84. Inspite of dieselisation and electrification of railways, it may be worthwhile to employ a regular fleet of colliers for transporting these quantities without causing strain on the railway system. The shortage of non-ferrous metals can be overcome to a certain extent with the establishment of smelters based on imported concentrates;but the requirements will have to be secured through official agencies on a defined basis. There will, of course, be no major problem with regard to Aluminium as the available bauxite deposits may be fully exploited. Also, Mysore will be in a position to meet the State's needs in respect of non-ferrous metals. As regards Cement, adequate limestone deposits exist and there may be a shortage, if at all, only in respect of gypsum. In regard to salt, the supply will be abundant and the scope for the development of salt-based chemicals near the coastal areas is considerable. Packing materials will, of course, have to be secured from outside sources though it may be examined whether processing units on the basis of 'imported' jute cloth can be established.

2. *Finance for large industries.*

2.1 Availablity of adequate finance is an important pre-requisite for achieving a higher growth rate and this is specially so in the case of a rapidly developing economy like ours which suffers from inadequate industrial growth on account of paucity of private savings and low capital formation. Consequently, industrial development has to depend on the various agencies of institutional finance.

2.2 The past two decades and a half witnessed an evolution of a number of institutional agencies such as the Industrial Finance Corporation of India (I.F.C.I.), the Industrial Credit and Investment Corporation of India (I.C.I.C.I), the Industrial Development Bank of India (I.D.B.I.), and the State Financial Corporations including the Tamil Nadu Industrial Investment Corporation. These institutions provide financial assistance in the form of loans, direct subscription to and underwriting of shares and debentures and guarantees. Besides, the two investment institutions, Life Insurance Corporation of India (L.I.C.), and the Unit Trust of India (U.T.I.) lend financial support to industrial units. Indeed, these agencies have contributed in no small measure to the economic development of the various States including Tamil Nadu.

2.3 Two new agencies, the Tamil Nadu Industrial Development Corporation Ltd., (T.I.D.C.O.) and the State Industries Promotion Corporation of Tamil Nadu (S.I.P.C.O.T) have been recently established for more effective promotion of industries and acceleration of industrialisation of the backward areas of the State, by offering a package scheme of incentives and liberal financial assistance. In addition to the above financial institutions, commercial banks have also extended financial help to industrial concerns in Tamil Nadu.

2.4 Out of a total of Rs. 1,576 crores provided by these institutions for the whole country, the share of Tamil Nadu works out to Rs. 186·48 crores or 12·8 per cent of aggregate.

2.5 So far as the large scale industries are concerned, I.D.B.I. has been a good source and the share of Tamil Nadu in the total is satisfactory. Other institutions too have lent liberal support to worthy propositions though the commercial banks take the credit for being the largest supplier of funds (including short term) for small-scale industries and road transport operators and for setting up of industrial estates.

2.6 Taking into account further assistance in subsequent periods institutional finance has been available in various forms to the extent of about Rs. 225 crores over a period. On a rough estimate, this may constitute about 20 per cent of aggregate fresh investment in the past decade and a half. While it can be expected that assured support will be forthcoming from these institutions for implementation of expansion and new schemes in the private and joint sectors, it will be necessary to obtain larger support for all ventures in the public, co-operative, joint and private sectors as in the next two plan periods there will be greater emphasis on the development of industries and the outlay on industrial projects may be over Rs. 1,750 crores in all sectors. If the proportion of institutional finance to fresh investment can be raised at least to 40 per cent (Rs. 700 crores) of the total and direct loan also can be secured from LIC in a big way, the banking system, the Rural Electrification Corporation and the Agricultural Refinance Corporation adequately for rural electrification, energisation of pumpsets, water-supply schemes, construction of sewage facilities and the like, the problem of mobilisation of resources will be rendered less difficult and it may not be necessary to impose heavy additional taxation and effect also sizeable savings out of current revenues. As regards the future, the main task should be to ensure a steady flow of new projects and expansion schemes in the years to come and in this context identification of new industrial possibilities through systematic techno-economic surveys and of entrepreneurrs with the requisite skill and ability assumes considerable significance.

It is therefore recommended :

2.7 When negotiating with statutory financial institutions, entrepreneurs have found that the institutions normally insist on the issue of preference shares along with equity shares, presumably to ensure right from the beginning a return on at least a part of their investment in the share capital of new companies. Such insistence may be in the, interest of the financial institutions but it will be desirable for the new companies to have a better gearing of capital-loan structure with a larger element of loan in lieu of preference shares, as this will improve the attractiveness of investment in their equity shares.

2.8 At present promoters have to separately negotiate with different financial institutions for concluding underwriting arrangements and this is found to be a time-consuming process. It will be helpful if the financial instititions authorise any one institution to deal with the promoters and settle the underwriting arrangements on behalf of all the participating institutions.

2.9 Under the present set up, I.D.B.I. is considered as the leader of consortium of long-term lending institutions. In cases where commercial banks participate with I.D.B.I. in extending assistance to projects, banks generally rely upon the project appraisals done by I.D.B.I., which are considered objective, scientific and thorough, and do not consider it necessary to make fresh appraisals. On the other hand, certain other financial institutions appraise the projects separately and independently and refer the cases to their Technical Advisory Committees ; all these result in duplication and needless delay. Besides, promoters have to prepare and present the same data relating to their projects in different forms to suit the individual requirement of each financial institution and deal with two or three such institutions at the same time. This strains the slender man-power resources of new projects in the initial stages. In cases where I.D.B.I. has appraised projects in detail, the other financial institutions may proceed further on the basis of the I.D.B.I. appraisals. It will also be desirable for financial institutions to evolve a system of common or joint appraisal of projects and thereby eliminate parallel appraisals of one and the same project by different institutions.

2·10. It will be helpful if promoters of new companies are not required by the financial institutions to fully subscribe for the shares agreed to be taken up by them, in cash, before the public issue of shares. On account of this requirement in quite a few cases, promoters have had to decide on a lower contribution to the share capital than originally envisaged. Besides, difficulties have been expressed in promoting new industries because of the requirement that promoters should contribute a minimum of 20 per cent of the equity capital or even 20 per cent of the aggregate capital cost of the projects. It is stated that I.D.B.I. follows a flexible policy regarding the extent of contribution by promoters ; even so, it is suggested that the State Government may raise this question with the financial institutions as a general issue and impress upon them about the desirability of prescribing a lower percentage of promoters' contribution. *It will be relatively easy to start new industrial enterprises if the promoters' contribution is fixed at, say* 10 *per cent of the fixed assets, or better still,* 10 *per cent of the equity capital.*

2.11 Financial institutions when sanctioning loans insist on security by way of legal mortgage of fixed assets ; similarly, even in the case of privately placed debentures legal mortgage of fixed assets is stipulated presumably on account of statutory restrictions. In view of the heavy stamp duty and registration charges involved in the case of legal mortgages and considering that equitable mortgages are in law as good as legal mortgages, financial institutions may invariably accept equitable mortgages as security for their loans.

2.12 In cases where assistance by way of both underwriting and loan is extended, most of the terms and conditions of loan are made applicable to the underwriting assistance as well. Often, assisted companies are called upon to furnish guarantees from their Chair man, Managing Directors and other top executives along with promoters, separately for the loan and for underwriting assistance even though the guarantees are identical in content. In view of the abolition of managing agency system and considering the very small stake of managerial personnel, financing institutions may review their policy in this regard and also consider whether personal guarantees from promoters and others may not be dispensed with altogether.

2.13 The policy in regard to conversion of a part of the loans into equity shares should be congenial to industrial growth. At present, financial institutions in most of the applicable cases stipulate that 20 per cent of the loans should be converted into equity. If this percentage is applied strictly, irrespective of the size of equity issues, there is a risk of the converted portions of the loans constituting a high percentage of the existing equity capital. This may have a discouraging effect. It is stated that the policy of the financial institutions in regard to conversion of loans is governed by the guidelines issued by the Central Government from time to time and that in the light thereof the assisted companies are clearly advised of the accounting years during which the conversion option may be exercised and other terms of conversion. It will, therefore, be useful to approach the Central Govern ment with a request to reformulate the guidelines and prescribe that not more than 10 per cent of the loans may be converted into equity in the formative stages of the projects and that there should be a ceiling for the percentages of equity capital when converting loans into equity.

2.14 As regards debentures and long-term loans, the general practice of insisting upon value of security that is twice the amount of the debenture/loans, may be relaxed as this may work against efficient financial management. The required cover may be fixed taking into account the type of industry, standing of the particular company, the purpose for which financing is being made available and, in applicable cases, the extent of contribution to debenture redemption reserve.

2.15 Financial institutions may expedite processing of applications for assistance and finalisation of legal formalities by standardizing their requirements. Instead of having separate loan agreements and mortgages, the institutions may consider having common loan agreements and common mortgage documents.

2.16 There are instances in which there has been an avoidable time lag between the sanction of assistance and its disbursement. Financial institutions may review their disbursement procedures with a view to simplifying them and ensuring timely disbursement of sanctioned funds for the concerned projects.

2.17 The State Government be requested to move with the Union Government for the establishment of regional board of the L. I. C. at Madras with powers to take decision for sanctioning loans up to Rs. 10 lakhs.

2.18 A separate cell may be established in the State Planning Commission or any other appropriate organisation for providing new entrepreneurs of medium as well as large-scale projects with detailed information and general guidance in regard to the availability of institutional finance.

587C 59—3A

CHAPTER V.

Metal-Based Industries.

1. *Introduction.*

1.1 Tamil Nadu is one of the highly industrialised States in India. The industrial production relates to automobiles, sugar, cement, textile, as well as machinery for production of these items, structurals, boilers, cycles, and a variety of other industrial and consumer materials. There are a number of Steel Rolling Mills engaged in the production of rods and sections. Primary raw materials for most of these industries are ferrous and non-ferrous metals. Unfortunately, the State has no industry for the production of basic metals except the Aluminium Plant at Mettur. The other major metal producing industry envisaged is the Salem Steel Plant which will be a major step in the right direction in the production of basic metal.

1.2 However, the production of basic metals from ore and ore-concentrates depends largely on the availability of resources in the locality. In Tamil Nadu, as such, with the available geological information, chances for production of basic metals such as copper, zinc, aluminium, etc., on a large-scale do not appear to be very bright in the foreseeable future unless large-scale deposits of ores are located in the State with fresh exploration. Another difficulty would be the non-availability of cheap power and coal in abundance, which would inhibit the production of basic metals on a large scale. Hence, it would be most advisable to develop the industries engaged in intermediary processing, producing semi-finished raw materials from the basic metals. This could be developed in this State very rapidly in the next 10 years. In fact, it could be said that it will be highly advantageous to get the metals as basic raw materials and produce the intermediary semi-finished raw material for use in the variety of industries mentioned earlier.

2. *Steel and Steel Products.*

2.1 Steel Industry is mostly centred in the North Eastern belt of India where most of the Steel Plants are located. These Steel Units, which are now of one to four million tonne capacity, supply steel throughout India at a standard price irrespective of the distance involved from the manufacturing unit, based on the freight equalisation plan. The out put from the steel units are rounds, sections, flat products such as skelps, strips, sheets, plates, etc. These products require to be further processed in medium sized industries into semi-finished raw materials for use in Engineering Industry. The semi-finished raw materials that are generally used in the Engineering Industry are hot rolled rods and sections, cold rolled strips, bright drawn bars and sections, tubes, metal sections, pipes, etc. Taking the basic value of steel at about Rs. 1,100 on an All India basis, these semi-finished products may be valued at anything between Rs. 2,000 to 5,000 or an average price of Rs. 3,500 per tonne. Hence, the added value per tonne of steel would be in the region of Rs. 2,400 per tonne.

2.2 This State, which can now be said to consume about 15 per cent of the steel produced in the country, could with advantage establish industries for the production of semi-finished raw materials. The State has the necessary technical know-how and

skill to develop the industries listed below without foreign help or supplies of foreign machinery and achieve the output envisaged in 10 years time. The output of these products that could be envisaged as one million tonnes for supply to this State, could with advantage, plan to supply, to the neighbouring States to the extent of half a million which would increase output to 1.5 million tonnes. The industries that need be established in this connection are :

2.2.1 Rods, bars, and sections,—produced in Rolling mills using Billets as raw materials.

2.2.2 Cold Rolling Mills for production of cold rolled strips for use in bicycles, automobiles, containers, in tube making, in electrical and in practically every Engineering Industry.

2.2.3 Bright Steel manufacture or Conversion of blackrods and Sections into bright rods and sections, mostly by drawing process for use in practically all Engineering Industries that use steel.

3. *Tubes.*

3.1 Welded Tubes for use in bicycles, transformers, boilers, automobiles and a wide range of Engineering Industries.

3.2 Seamless tubes for use in High temperature boilers, in the manufacture of ball bearings and for other specialised industrial applications.

3.3 *Pipes* for domestic and industrial use for conveying water, gas and other fluids extensively used in industrial and chemical engineering fields as also for domestic purpose.

3.4 *Wire and Wire Products* for a wide range of industrial use.

4. Production of semi-finished raw materials such as rods, strips, bright rods, and sections, tubes, wire and wire products, could be organised in medium sized units ranging from 5,000 to 30,000 tonnes capacity for which the bulk of machinery could be manufactured in India. A high percentage of these machineries could be fabricated in the State itself by either expanding the existing units or establishing new units. Probably this State, with its vast reservoir of trained engineers, and a large number of engineering units that could undertake manufacture of machinery for these industries, is highly suited for developing machinery industry also.

4.1 For these industries the capital turnover is in the region of 2 times, the total invested capital of which 50 per cent may be treated as fixed assets and the other 50 per cent as working capital . These industries normally enjoy a high turnover and a considerable margin of profit with comparatively low utilisation of power, coal and coke. For instance, a tube making unit with Rs. 2 crores of rupees invested as fixed assets and Rs. 2 crores as working capital, will easily have an output of Rs. 8 crores a year with a margin of profit of 15 per cent on turnover. Based on this general formula, the establishment in ten years of these industries for an output of one million tonnes per annum having a production value of Rs. 211 crores would require an investment of Rs. 53·5 crores in fixed assets in

the next ten years. Since a high percentage of the machinery for the production of the semi-finished raw materials would be manufactured in this State itself, this would auto matically result in the expansion activities of the existing units, and in the establishment of new units for steel processing machinery.

5. *Alloy Steel.*

5.1 The requirement of Alloy Steel has its fixed relationship to consumption of mild steel. As mild steel consumption goes up, requirement of Alloy Steel in the form of castings, forgings, bars, sections, sheets, etc. also would go up correspondingly. Alloy Steels are mostly produced in Arc Furnaces using mild steel scrap as basic raw material, to which are added ferror-alloys to give the requried alloy steel. This State is particularly suited for the establishment of a number of Alloy Steel Units for producing a variety of alloy steel materials. Arc Furnaces upto 10 tonnes capacity would now be manufactured in this State. The most popular units are 5 to 10 tonnes capacity Arc Furnaces for Low Grade Alloys and 3 to 5 tonnes Furnaces for High Grade Alloys. A 10 tonne Furnace would have an output of 15,000 tonnes per annum of molten metal and about 10,000 tonnes of finished alloy steel. Smaller units produce quantities in direct proportion to their capacity.

5.2 Such units could, with advantage, be an adjunct of every major steel processing unit and the objective should be to co-ordinate the range of production of the different units and that of the Salem Steel Plant. This requires only a few highly skilled personnel to operate the furnace, and carry out other finishing operations. The bulk of the labour would be only semi-skilled artisans who would easily be trained.

5.3 One of the main items of production is steel castings which requires a large number of skilled moulders. The artisans in this category are very highly skilled and produce more intricate and complicated castings. The process of moulding is highly labour intensive and cannot easily be mechanised. The State will be at a particular advantage of exporting such castings to other States and to other countries also. Similarly, the alloy forgings could also use with advantage the skill of the balcksmith community spread throughout the State.

5.4 The fresh investment required for manufacturing alloy steel and castings on a co-ordinated basis will have to be Rs. 35 crores including working capital of Rs. 10 crores. The value of new output will be Rs. 66 crores.

5.5 The Alloy Steel and Steel Castings Units could be combined with advantage. This State has already five or six such units. Since the entire machinery could be indigenously fabricated, no major problems in resources either by way of machinery, raw material, or skilled labour need be anticipated. The establishment of alloy steel producing units would also substantially increase production of refractories in the State for which suitable raw materials are available in the State in adequate quantities.

6. *Grey Iron Castings and Spun Pipes.*

6.1 The Grey Iron Castings and Spun Pipes form complementary industries. The basic material used is pig iron which is available in adequate quantity in the country.

6.2 The State could envisage a production of 110,000 tonnes of pipes. The present pipe capacity has to be increased from 50,000 to 110,000 tonnes.

	RS. IN CRORES.
Increase of pipes by 60,000 tonnes at Rs. 1,250 per tonne	7·5
Additional Grey Iron and Special Grade Castings including Machine Tool Grade Castings 60,000 tonnes at Rs. 2,000 per tonne.	12
	19·5

For this output the investment would be as follows :—

	RS. IN CRORES.
Fixed assets	6·5
Working Capital	6·5
	13

Though this may not be as highly profitable as other steel lines, this would be a necessary complementary industry for steel machinery and other engineering industries. Planning should undertake to establish this. However, the profit margin would provide a good return to the investment, and justify the additional investment to increase the capacity by expansion of existing units and by establishment of new units.

7. The expansion of Steel Processing recommended for implementation is summarised as follows :—

	Investments		*Turnover.*
	Fixed Assets.	*Working Capital.*	
	(RS. IN CRORES.)		
1. Re-rolling mill for Bars, Rods and Sections.	12·0	12·0	50·0
2. Semi-finished raw materials such as Cold Rolled, strips) pipes and tubes, metal sections, bright bars and sections wire and wire products.	41·5	54·0	161·0
3. Alloy Steels	15·0	20·0	66·0
4. Grey Iron Castings and Spun Pipes ..	6·5	6·5	19·5
	75·0	92·5	296·5

8. *Copper.*

8.1 Next to steel, and, probably in recent times Aluminium, Copper is the most extensively used industrial metal. It is principally issued as Conductor in Electrical Industry in the form of electrolytic copper wires, flats and other sections. There are also a wide variety of copper alloys such as bronze, gun metal, brass, aluminium, and so on, which are extensively used in industry.

8.2 Copper is primarily imported into the country at international price, principally from West European sources though the mining itself takes place in Africa, South America which have exportable surplus. The other major producing countries, Canada, and United States, though large scale producers, do not have much exportable surplus. The copper is usually imported in ingot form as pure electrolytic copper and further processed within the country. The first operation is for ingot to be hot rolled into rods. These rods are subesquently drawn, rolled or extruded into wires, bars and other sections which are mostly done by cold working process. This State which uses a fairly large quantity, about 15 per cent of the copper imported in the country, has no Rod Rolling Mill of its own. The entire copper imported in the form of ingot is transported to either Bombay or Calcutta, rolled into rods and returned. Actually, the transport costs in this case are much higher than even the rolling costs. There is need to establish a Rolling Industry for this primary operation. The other process which are wire drawing, extrusion, etc., though carried out on small scales, are not adequate to meet local demands. The machinery required for these processes are already manufactured within the country.

8·3 Notwithstanding the substituion of aluminium for copper as Conductors in Electrical Industry, we may expect the consumption of copper to go up substantially in the next ten years. We may anticipate the rate of consumption to go up to 30,000 tonnes per annum in this State at the Indian price of Rs. 15,000 per ton, making a total of Rs. 450 million (expected All-India consumption by 1975–76 is 330 million tonnes). This, together with other alloying elements such as tin, zinc, aluminium, etc., would make for a total output of about Rs. 60 crores by adding another Rs. 15 crores by way of alloys which may be valued anything between Rs. 15,000 to 35,000 per tonne in the form of semi-finished raw material. Planning for the next ten years should envisage establishment of :—

8.3.1 Copper Rolling Units rolling ingots into rods.

8.3.2 Smelting Units for production of copper based alloys.

8.3.3 Units for production of semi-finished raw materials, such as wires, bars, extruded sections, etc., of copper and copper alloys.

8.3.4 The total investment for processing copper and for producing such semi-finished raw materials may be estimated at Rs. 10 crores for fixed assets and Rs. 30 crores for working capital. The investment involved giving a total output of Rs. 60 crores may be summarised as follows :—

	Fixed Asset.	*Working Capital.*	*Total investment.*	*Total output.*
		(RUPEES IN CRORES.)		
Rolling	2·5	5·0	7·5	..
Smelting	2·5	10·0	12·5	..
Drawing Extrusion, etc. ..	5·0	15·0	20·0	..
Total ..	10·0	30·0	40·0	60·0*

* The out put figures for individual processes are not furnished as the same material will go through one or all the processes.

9. The feasibility of establishing smelters based on imported concentrates will also have to be examined. A smelter with a capacity of 50,000 tonnes annually may cost about Rs. 20 crores.

10. *Aluminium.*

10.1 The Aluminium Industry is fairly well developed in the State. Production of basic aluminium which is at 12,500 tonnes per annum of output would be increased to 25,000 tonnes per annum during 1972, in the only Aluminium Producing Plant at Mettur. Increase of production to 75,000 tonnes per annum should be envisaged. The All-India Production is expected to be 330,000 tonnes by 1975–76 and probably 500,000 by 1980–81. Production of aluminium is essentially an electrolytic process using large quantities of electric power about 10,000 units per tonne of aluminium produced. Hence, the increase of output would largely depend on the availability of adequate power at special rates for this work. The increase in production to 75,000 tonnes would require an investment of Rs. 25 crores.

10.2 Subsequent to production of basic metal in the form of ingots, the aluminium has to be rolled into rods, sheets, etc., and drawn and extruded into sections very similar to copper. The major use for aluminium is as an Electrolytic Conductor in Electrical Industry. It is also extensively used for domestic purposes. In the form of vessels, containers, etc., Aluminium foils are being extensively used as package medium. This State though has a number of industries engaged in production of rods, etc., there is further scope for establishment of industries for producing semi-finished materials such as strips, foils, extruded sections, wires and wire products.

10.3 The basic aluminium is valued at Rs. 6,000 per tonne. The production of 75,000 tonnes per annum envisaged will give a total value of Rs. 45 crores. This would mean an increase to 30 crores level during the next 10 years for which investment of fixed assets would be Rs. 20 crores and working capital Rs. 15 crores.

10.4 The semi-finished raw materials may be valued anything between Rs. 8,000 to 20,000 per tonne, giving an average price of Rs. 14,000 per tonne. The output of the semi-finished raw material, excluding the value of basic metal would be another Rs. 35 crores. The State has already got the industry and the additional output envisaged is Rs. 70 crores for which the investment will be Rs. 30 crores by way of fixed assets and Rs. 30 crores by way of working capital.

The scheme may be snmmarised as follows :—

	Fixed Asset.	*Working Capital.*	*Total investment.*	*Output.*
		(RUPEES IN CRORES.)		
1. Increasing present output of basic metal from 25,000 tonnes to 75,000 tonnes per annum.	20	15	35	30

	Fixed Asset.	*Working Capital.*	*Total investment.*	*Output.*
		(RUPEES IN CRORES.)		
2. Increasing present output of semi-finished raw materials from 25,000 to 75,000 tonnes per annum.	10	15	25	40
	30	30	60	70

11. *Other non-ferrous metals based on lead, zinc, tin, etc.*—The other basic metals used in the form of alloys are lead, zinc and tin alloyed in various proportions for production of materials such as soldering metal, white metal for bearings and other items. None of these basic metals are produced in the State and most of the materials such as tin, zinc, and lead are also imported into the country. However, smelting units for the production of various alloys can be established in the State, as also other finishing industries for production of bearings and other items. A provision has been made for a total investment of Rs. 6 crores with an output target of Rs. 8·5 crores to be achieved in the next 10 years.

12. *Machine Industry.*

12.1 Tamil Nadu has reached a stage when it could with advantage take up fabrication of light and medium size machinery on an extensive scale. The State already manufactures machinery for Sugar, Cement, Textile, Paper and Machine Tool Industry of general purpose category. Fabrication of machinery generally involve manufacture of good quality grey iron castings, steel castings, forgings and machining and assembly. Facilities exist for production of grey iron castings up to 15 tonnes weight which could cover most of the requirements of heavy grey iron castings. There are a number of Arc Furnaces which would produce good quality steel and alloy steel castings up to about 2 tonnes per piece. The Arc Furnace at Arakonam Continuous Casting Plant which has a 25 tonnes capacity can ultimately be made to produce castings up to 15 tonnes finished weight.

12.2 Fabrication of machinery would also require forgings for which heavy forging hammers have to be installed. Forging for such manufacture and machining of castings and forgings would require very heavy machine tools which, though available in limited quantities in the State, would have to be further expanded by new installations for undertaking such fabrications. Such heavy machine tools required for machining of heavy weight castings and forgings to a high degree of precision would require installation of sophisticated machinery which are not available in the country. These would have to be imported but this is not likely to be a difficult proposition as most of them would be available from rupee payment countries or under some aid from foreign countries. The requirements of such machine tools for making these machineries in terms of foreign currency would not be much compared to the output.

12.3. The category of machinery that could be planned for production in this State apart from those already mentioned in the earlier paragraph are steel processing Machinery and also auxiliary and component parts for Steel making unit. It is estimated that auxiliary and components and spares for the steel plants which have to be mostly

imported would be about 250 million in terms of money value, for the next ten years. This gives an idea of the requirements of such machinery and components. The Survey Team that visited the State from Heavy Engineering Corporation at Ranchi were making efforts to find indigenous sources who could undertake such fabrication and manufacture. This State could, with advantage, try to produce a substantial portion of the country's requirement in the next 10 years. The planning envisaged should be for manufacture of the following machinery :

1. Textile Machinery.

2. Cement Machinery.

3. Sugar Machinery.

4. Paper Machinery.

5. Steel Processing Machinery for medium size industry and also Aluminium and Copper processing industry.

6. Steel Machinery and parts for Major Steel Plants.

12.4. For this purpose the State should enlarge the existing machinery manufacturing units and, if necessary, form a consortium with a holding company who could with advantage secure orders and distribute it among the various manufacturing units to enable the State to operate these units in a co-ordinated manner. In heavy machinery fabrication such structuring of the industry is quite common in foreign countries, and in fact would be necessary. In an industry of this nature, the planning has to be done atleast five years in advance and the turnover of the capital also would be rather low. Special arrangements are necessary to finance the Machinery Manufacturing Industry. For achieving the rated output of Rs. 45 crores the investment of fixed assets would be Rs. 15 crores and working capital would be Rs. 15 crores.

12.5. The investment and output envisaged for the next ten years could be summarised as follows :—

	Fixed Asset.	*Working Capital.*	*Total investment.*	*Output.*
	(RUPEES IN CRORES.)			
(1)	(2)	(3)	(4)	(5)
1 Textile Machinery	1·7	1·7	3·4	6·0
2 Cement Machinery	1·2	1·2	2·4	5 0
3 Sugar Machinery	1·7	1·7	3 4	6 0
4 Paper Machinery	0·8	0·8	1·6	3·0
5 Steel Processing Machinery for medium size industry and also Aluminium and Copper Processing Machinery.	4·8	4·8	9·6	12·5
6 Steel Machinery and parts for Major Steel Plants.	4·8	4·8	9·6	12·5
	15·0	15·0	30·0	45·0

13. *Machine Tool Industry.*

13.1. Tamil Nadu has not had a good record of growth of Machine Tool Industry and should be considered in this respect backward compared to other industrialised States. No major items of machine tool of heavy capacity are manufactured. The items that are manufactured mostly consist of simple lathes, shaping machines, grinding machines, centreless grinders, wood working machines, etc. However, the growth of Machine Tool Industry in India has been spectacular. The Production value of Machine Tool Industry reached a record figure of Rs. 35·5 crores per annum in 1965-66 compared to hardly Rs. 8 crores in 1950–51. The projection for All-India is estimated at a production of Rs. 115 crores by 1980–81. Tamil Nadu should now plan to make up this leeway in the Machine Tool Industry by establishing a base. The following groups of industries are recommended for increasing the output to Rs. 10 crores in the next 10 years for which it is proposed it to invest Rs. 3 crores by way of fixed assets and Rs. 4·5 crores by way of working Capital.

Group I—(a) Production of Plano-Milling Machine (Single Column with double tool post).

(b) Double Column Plano-Milling Machine.

(c) Double Column Plano-Milling Machine with grinding attachment.

(d) Programme Controlled Milling Machines.

(e) Production Jig Boring Machines.

Group II—(a) Semi Automatic Turning Machines.

(b) Fully Automatic Turning Machines.

(c) Lathes with copying attachment.

(d) Programme controlled lathes.

Group III—(a) Horizontal Boring Machine.

(b) Double headed fine Boaring Machine.

(c) Multi Spindle Drilling Machine.

(d) Programme Controlled Boring Machine.

Group IV—(a) Cylindrical Grinding Machines.

(b) Internal Grinding Machines.

(c) Vertical Spindle Rotary and Reciprocating Table Surface Grinding.

Group V—(A) *Machine Tool Accessories such as.—*

(a) Universal Tool and Cutter grinding attachment.

(b) Copying attachment for Milling Machine and turning.

(c) Lathe Chucks.

(d) Indexing attachment.

(e) Rotary Table.

(f) Boring Heads.

(B) *Cutting Tools such as.—*

(a) Milling cutters.

(b) Portable tools like "Wolf" grinding machine, wood working machine, etc.

(c) Hand tools.

14. *Conclusion.*—The metal based and metal industries will have to play a prominent role in developing the State's economy in a perspective plan period. There will necessarly be some difficulty in engaging in the manufacture of non-ferrous metal in a big way due to the none too abundant mineral resources, but the manufacture of alloy steel can be on a scale which will meet not only the States' needs but also regional requirements to a significant extent while steel processing industries can proceed to create capacities far in excess of those indicated earlier because a good base already exists and the required skilled and technical personnel can be trained in a short period. In the light of new developments it may therefore be necessary to manufacture larger quantities of textiles, cement, sugar and various types of machinery and also castings and forgings of different kinds. For this reason the total outlay of Rs. 135·5 crores may have to be exceeded by 25 to 30 per cent.

TABLE I.

Investments for Fifth and Sixth Plans.

	Fixed Assets.	*Working Capital.*	*Total requirements.*	*Output.*
		(RUPEES IN CRORES.)		
I Metal and Metal Based Industries.—				
(1) Steel	75·0	92·5	167·5	296·5
(2) Copper	10·0	30·0	40·0	60·0
(3) Aluminium	30·0	30·0	60·0	70·0
(4) Other Non-Ferrous Metals based on lead, zinc, tin, etc.	2·5	3·5	6·0	8·5
II. Machinery	15·0	15·0	30·0	45·0
III. Machine tools	3·0	4·5	7·5	10·0
	135·5	175·5	311·0	490·0

TABLE II.

	Proposed increase in Tamil Nadu in Ten year period.		*Investment.*		
	Output. (quantity in tons).	*Value in crores of Rupees.*	*Fixed assets.*	*Working capital.*	*Total requirements.*
			(RUPEES IN CRORES.)		
I. Metal and Metal Based Industries.—					
(1) Steel	990,000	296·5	75·0	92·5	167·5
(2) Copper	20,000	60·0	10·0	30·0	40·0
(3) Aluminium ..	100,000	70·0	30·0	30·0	60·0

	Proposed increase in Tamil Nadu in Ten-years period.		*Investment.*		
	Output quantity tons).	*Value in crores of Rupees.*	***Fixed assets.***	***Working capital.***	***Total requirements.***
		(RUPEES IN CRORES.)			
(4) Other non-ferrous Metal based on Lead, Zine, Tin, etc.	..	8·5	2·5	3·5	6·0
II. Machinery ..	..	45·0	15·0	15·0	30·0
III. Machine tools ..	..	10·0	3·0	4·5	7·5
Total ..	..	490·0	135·5	175·5	311·0

TABLE III.

Sources of Finance for Total Investment over Ten Year period.

	Equity capital.	*Loans.*	*Total.*
	(RUPEES IN CRORES.)		
1. Tamil Nadu through Financial Institutions such as TIIC, TIDCO, SIPCOT, etc.	20	26	46
2. Private sources—Fresh Equity Investment in Private and Joint Sectors and Deposits.	20	20 (deposits)	40
3. Existing Company through Investment from generated cash.	10	15	25
4. Central Financing Institutions such as ICICI, IFC, IDBI, LIC, Unit Trust.	25	75 (IDBI) Machinery on deferred payment.	100
5. Banks	..	100 (Working capital by hopothecation and pledge loan.)	100
Total ..	75	236	311

CHAPTER VI.

Automobiles and Allied Industries.

1. *A General Survey.*

1.1 The pre-eminent position of Tamil Nadu in the development of automobile and ancillary industries will be helpful in achieving a faster rate of growth in the coming years in absolute terms though in the context of the consciousness to bring about more dispersed development, particularly ancillary industries, motor cycles, and bicycles, it may not be feasible to maintain the high proportion of regional production to all-India production in some sectors. This will not, however, mean a slowing down of some of the phases of development in affected sectors, as there will be virtual boom in the Transport Industries in the 10 year plan period. In the initial stages, there will have to be an increase in the percentage of shares, as a quick increase in the production of ancillary industries in particular, can be achieved only with intensive use of existing facilities and implementation of expansion schemes of the established producers. This will be apart from proposals for starting new units.

1.2 A large and steady-base has been created in the past two decades and there is probably no single State in the whole country which can boast of this sizeable share in All-India production of cars, commercial vehicles, tractors, motor-cycles and scooters, auto-ancillaries and bicycles. Only in respect of car production and light commercial vehicles not much progress has been made in recent years due to their special problems. But this can be overcome soon and the existing capacity can be more than effectively utilised. The existing producer of commercial vehicles has plans for doubling the out-put of medium size commercial vehicles and substantially raising the turnover in heavy duty vehicles. All the ancillary units have been expanding their activities regularly, while the only producer of motor-cycles has already embarked on a scheme for trebling production in the next three years. Likewise, the major producer of bicycles has just completed an expansion scheme and the decentralised sector also is developing. A new unit is springing up for turning out earth moving machinery. The growth of these industries have been greatly facilitated by the ready availability of entrepreneurial skill and the ability of workers in Tamil Nadu to quickly learn operations requiring varying skill. The lead gained can be advantageously utilised for maintaining the fairly high share of All-India production in many directions and participating in a big way in the difficult and challenging task that lies ahead.

1.3 The investement envisaged in the Perspective Plan period 1974–84 can be easily of the order of Rs. 150 crores, which can be distributed as follows :—

Outlay proposed for the Perspective Plan period.

	(Rs. in crores.)
Cars	20
Commercial vehicles	40
Tractors	20

Outlay proposed for the Perspective Plan period—cont.

	(RS. IN CRORES.)
Ancillaries	20
Motor Cycles and Scooters ..	10
Tyres	30
Total ..	140

Regarding bicycles, the position has to be as follows :—

Bicycles (Major manufacture) ..	5
Bicycles (Ancillary units) ..	5
Total ..	10

1.4 T. I. Cycles of India already have a sanctioned capacity to manufacture 7 lakh cycles. They can easily expand to manufacture one million cycles. Some ancillary units may be set up to manufacture certain components, for example, cranks, lugs, BH shells, pedals, etc. The ancillary units can manufacture some of the components which are easy to manufacture where precision and advanced techniques are not very important.

1.5 An outlay of Rs. 150 crores will result in an estimated increase in direct employment of 40,000 persons and increase in productive turnover of Rs. 350 crores. Indirect employment will be to the extent of 150,000.

2. *Commercial Vehicles.*

2.1 The output of commercial vehicles is presently around 5,500 units consisting of 5,090 units of comets, 210 units of heavy duty vehicles and 228 units of standard one-ton vehicles. There is full utilisation of capacity for comets while the output of heavy duty vehicles is dependent on the availability of imported components. The difficulties in this regard are being overcome with greater attention to the manufacture of components indigenously in the light of developing demand. The output of light vehicles is picking up and there may be a larger demand in the coming years leading to full use of existing capacity and also a fast expansion. There is already a scheme for doubling the output of comets in the next five years to 10,000 units while the heavy duty vehicles may increase gradually to 2,000 units. The present share of Tamil Nadu in all-India production is 12·4 per cent in respect of medium-sized commercial vehicles and the All-India demand is expected to increase to 1·5 lakh units by 1983–84. In anticipation of unexpected growth in demand and the need to create fresh capacity, new facilities will have to be made available for enabling a production of 25,000 units by 1983–84. Ashok Leyland may naturally like to increase its capacity to say 15,000 comet units, if not more. Also, consideration may have to be given whether there is a scope for a new unit for manufacturing cars as well as for commercial vehicles, to meet the increasing demand. The output of light commercial vehicles, will have to be raised six-fold at least to 6,000 units by the end of the Sixth Plan. The capital outlay on the expansion of new schemes may be roughly Rs. 40 crores. These are conservative estimates and the position may have to be revised before 1978–79 with a view to accelerating the development of transport industries in the desired

direction and it may well happen that the targets may have to be raised by another 25 per cent in the Sixth Plan if the take-off stage is reached as it is likely by the end of the Fifth Plan.

3. *Cars.*

3.1. The progress achieved by Tamil Nadu in the manufacture of cars during the last 10 years has not been satisfactory. The only unit, which is engaged in the production of cars is the "Standard Motors Products of India Limited" with its factory at Vandalur in South Madras. This unit, until 1965, was producing mainly passenger cars and had a capacity around 4,000 units. As it was felt that the economics of the working of the company would be improved considerably if light trucks were also produced, the manufacture of this type of vehicles was begun in 1965 with a licensed capacity of 2,500 units annually. A very high level of indigenous content is being achieved at the factory itself, with the same group accounting for the manufacture of a variety of ancillary components like Carburators, Shock absorbers and Radiators.

3.2. The average annual production of cars in the last ten years in Tamil Nadu works to 2,894. The present share of the State in the All-India production works to 11 per cent. It has been estimated that All-India demand for cars in 1973–74 will be of the order of 75,000 nos. and Tamil Nadu to maintain the same share of All-India market, will have to account for 8,250 units. This means an aggressive plan for an increase in production, efficiency and capacity. It will also be necessary to aim at a more than doubling of the present production from 8,250 in 1973–74 to 22,500 units in 1983–84. If we do not take active measures to retain production atleast at the current share in All-India output, the State will lose its pre-eminent position and drop to only 4·5 per cent. What is more, Tamil Nadu is in an advantageous position when compared to other States, in the matter of automobile ancillaries. While efforts will have to be made to overcome the difficulties of the existing producer to fully utilise the existing capacity, it calls for advance planning for creating new capacity in the existing unit, if not in new units as well.

3.3. As it will be advantageous from the national angle and for regional development to increase substantially the output of cars in Tamil Nadu, the objective should be to increase even the share from 11 per cent to 15 per cent. On the assumption, that the All-India demand for cars will rise to 1·5 lakh units by 1983–84, Tamil Nadu will have to account for an output of 22,500 units to be attributed to the existing unit, if it is in a position to expand and/or new units.

3.4. At present, there is under-utilisation in the only car unit in Tamil Nadu to the extent of 50 per cent. In order to achieve a fuller utilisation of the existing capacity the Task Force feels sure that aggressive steps will be taken with the full support of the State or Central Government by way of improvement in productivity, allocation of steel, licences, etc.

4. *Cycles.*

4.1. The pioneering effort in the bicycle industry came about in 1949, when a large-sized unit Tube Investments of India was established at Ambattur for manufacturing bicycles. This unit has been progressing steadily and now accounts for about 19 per cent of the total output in India. It has further plans for expansion in the coming years. The

Company has two tube mills and these meet the requirements of their own cycle manufacturing unit, T.I. cycles of India, and they supply various types of tubes to outside customers. They have a cold rolling mill also. They manufacture saddles and their two subsidiary companies are manufacturing cycle and industrial chains and dynamo lamps for cycles, scooters and mopeds. The products of Tube Investments of India Ltd., are sold to producers in India and are also exported.

4.2. The import content in bicycles is now negligible and if only the required raw materials can be made available from indigenous sources, there will be uninterrupted growth of this industry.

4.3. The maximum annual production so far recorded in the State is about 4 lakhs as against the sanctioned capacity of 7 lakhs. Various causes account for this under-utilisation, the most important of which are :

1. Higher cost of production in Tamil Nadu on account of :

(*a*) Higher power and labour charges.

(*b*) While C.S.T. charged by the other States manufacturing bicycles is 1 per cent, Tamil Nadu charges 3 per cent.

2. Scarcity of essential raw materials from time to time.

4.4. On the basis of an estimated All-India demand of 50 lakhs in 1983-84, Tamil Nadu's share, if fixed at 20 per cent will work out to 10 lakhs. It is recommended that this industry should be given all assistance first to achieve full utilisation of its existing sanctioned capacity of 7 lakhs and, then, to increase its production to one million. This can be done by increasing the capacity of the existing unit and by encouraging it to develop some ancillary units for supplying certain components where precision and advanced techniques are not very important.

5. *Tractors.*

5.1. The Union Planning Commission has estimated that in the last year of the Fourth Five-Year Plan, the country would need 90,000 tractors. However, the manufacturers of Tractors estimated that the demand will be around 70,000. There are at present six manufacturers with an installed capacity of 36,000 and in 1970, they have produced only 19,890 units. Out of the above, three major manufacturers have started manufacturing the item only in 1964–65 and hence, Tamil Nadu's share of tractor production reveals a higher percentage. Besides, the Government of India have issued licenses for six more units with a capacity of 35,000 tractors and also letters of intent to another 15 manufacturers for a capacity of 120,000 units. It is doubtful whether all the manufacturers, who have been issued the letters of intent, will actually go into production. Tamil Nadu's present share of All-India production is 28·5 per cent and it is difficult whether it would be possible for Tamil Nadu to maintain this share especially because of the sanctioning of new units and the issue of letters of intent for additional units. All that Tamil Nadu could hope is to aim at a 15 to 20 per cent share of the All-India production in 1983–84 and this may work to about 30,000 units with the total demand at 1·5 lakh units. This, however, can be achieved by resorting either to expanding the capacity of the existing units or establishing new units or both.

6. *Motor Cycles and Scootors.*

6.1. The automobile industry in its other departments has grown up so well that there is raising level of output of motor-cycles and scooters. The established factory of Enfield India Limited at Thiruvottiyur in North Madras is engaged in the manufacture of heavy and light motor-cycles and scooters. The licensed capacity for motor-cycles is 12,800 units. In view of the developing demand, this capacity is being raised to 16,000 units, while approval has been obtained to have a total capacity of 30,000 units. A new factory in Ramanathapuram district with a capacity of 14,000 units is under erection.

6.2. The average annual production of motor-cycles and scooters in the last 10 years has been estimated at 6,940 units and current production is 10,510 units and the present share of Tamil Nadu in the All-India output works to about 13·7 per cent and to maintain the same share the output in 1973-74 will have to be 30,000 units. It is estimated that in order to maintain the same share in 1983–84, Tamil Nadu's output will have to expand by three times, i.e., 90,000 units. While the existing unit can expand still further, it may be desirable to consider new units also to meet the anticipated demand in 1983–84.

7. *Auto Ancillaries.*

7.1. The most spectacular achievement in the automobile ancillary industry is the financing role played by the Simpson Group or a little later by the T.V.S. Units at Padi. Between the two, a sizeable portion of the needs of the automobile industry are met. Wheels India Limited is producing different types of wheels for commercial vehicles and has a programme for doubling its output in the Fourth Plan period. Lucas T.V.S. Limited, has likewise facilities for manufacturing different types of electrical equipments required for automobiles, while Brakes India Limited and Sundaram Clayton Limited are engaged in the manufacture of braking equipments. These units have in their turn, created a demand for numerous products like bolts and nuts, fasteners, coils, castings, etc., which has led to new activity in the Small Scale Sector. There are other units which are engaged in the production of engine valves, tie-rod-ends, clutch discs, radiators and a host of other items which are required for assembling cars and trucks. Rane (Madras) Limited, Engine Valves and Rane Brake Linings India Limited have their factories at Velacheri in South Madras. The products turned out by all the ancillary units are being supplied as original equipment to nearly all the automobile producers.

7.2. India Pistons Limited is the largest producer of pistons and rings. Started in 1949, the company doubled its poduction by 1962 and has now almost succeeded in trebling its output from the 1962 level. Shardlow India Limited, another member of the Simpson Group is producing forgings and stampings mainly for the automobile industry while Bimetal Bearings Limited is manufacturing thin wall precision bearings, India Pistons Repco Ltd., is manufacturing fly-wheel ring gears.

7.3. With regard to auto-ancillaries, the study reveals that the annual production for the last 10 years was of the order of Rs. 35·4 crores. The present share of Tamil Nadu in the All-India output is about 30 per cent and works to Rs. 51 crores. With the scope for increasing Tamil Nadu's share in the production of cars, commercial vehicles, motor-cycles and scooters, it can be safely expected that the output of the auto ancillaries will have to be

around Rs. 125 crores by 1983–84. The proportions will naturally have to vary in respect of the manufacture of individual items. But Tamil Nadu will have to maintain its pre-eminent position in the field.

8. *Tyres.*

8.1. The tyre industry is well developed and there are at present two units operating in the State. The first large sized factory was started by Dunlop Rubber Company, India Limited at Ambattur in 1956. The capacity of this unit has now been doubled. Another unit belonging to the Madras Rubber Factory, which started functioning from 1962, is perhaps the most successful of the new entrants to this line. This unit has a capacity of 6·1 lakh sets of tyres and tubes annually and a complete range of products being turned out. There is also a scheme for manufacturing 2 million cycle tyres.

8.2. With the expanded facilities in full operation Tamil Nadu will be able to account for over 16 per cent of All-India production in 1972. This share may not be maintained in the coming years if every State in the country puts up its own units. But the demand is likely to increase to 15 million sets in 1983–84 and in view of these known difficulties in starting highly capital intensive units, Tamil Nadu can hope to have atleast a share of 12½ per cent in an expanded volume. This will involve a doubling of the output to 2 million sets. While the new unit in Ramanathapuram in joint sector may have a capacity of 5 lakh sets in ten years, the balance of 15 lakh sets can be allowed to be met through the expansion of capacity of the existing units.

9. *General recommendations.*

It is recommended :

9.1. In view of the heavy outlay of Rs. 150 crores involved in the stepping up of production and the varying profitability of the different operations, the policy of Government should be to provide the necessary financial assistance on an institutional basis, apart from the confidence the existing and new units can create in attracting equity capital, based on a realistic profits and dividends policy.

9.2. The pattern of investment that is required in the automobile industry for maintaining the same share of market will be about Rs. 20 crores for cars and Rs. 40 crores for commercial vehicles, Rs. 20 crores for tractors, Rs. 10 crores for bicycles, Rs. 20 crores for ancillaries, Rs. 30 crores for tyres and Rs. 10 crores for motor-cycles and scooters.

9.3. The Industry has to be assured of an adequate supply of steel.

9·4. It is imperative that a healthy labour management relation is maintained in the industry to make such a growth possible and sustain it.

9.5. Financial assistance from specialised financial institutions has to be increased in a big way to give a fillip to the large scale investment.

9.6. It is essential that emergency steps are taken to achieve fuller utilisation of existing capacity in cars, tractors and bicycles.

9.7. Fuller utilisation of the auto-ancillary output can be effected by Mahindra and Mahindra exploiting the possibility of setting up an assembly plant in Tamil Nadu for Jeeps so that it can cater to the needs of Andhra Pradesh, Mysore, Tamil Nadu and Kerala.

9.8. There is an urgent need to have a Research and Development Wing in Tamil Nadu which can be set up in liaison with the Automotive Research Association in Poona or as a separate autonomous unit attached to the Madras Institute of Technology actively supported by the industry.

TABLE I.

TARGETS FIXED FOR COMMERCIAL VEHICLES IN THE THIRD, FOURTH AND FIFTH FIVE-YEAR PLANS.

	Third Plan (1961–66).		*Fourth Plan* (1969–70—1973–74).		*Fifth Plan* (1978–79).	
	Target.	*Production in* 1965–66.	*Target.* (1969–70).	*Production in* 1969–70.	*Target* (1973–74).	*Target* (1978–79)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Commercial Vehicles (3 tons and above).	60,000 (Includes Light, Com. Vehicles).	35,347	42,000	29,321	75,000	120,000

TABLE II.

THE TOTAL PRODUCTION OF CARS IN ALL INDIA.

Name of the manufacturer.	1960	1961	1962	1963	1964
(1)	(2)	(3)	(4)	(5)	(6)
Hindustan Motors	9,217	11,056	13,438	8,627	15,351
Premier Automobiles	6,516	7,197	6,247	3,750	3,867
Standard Motors	3,364	3,409	3,641	3,340	4,009
	19,097	21,662	23,326	15,711	23,227

Name of the manufacturer.	1965	1966	1967	1968	1969
	(7)	(8)	(9)	(10)	(11)
Hindustan Motors	15,558	19,469	20,515	22,687	21,560
Premier Automobiles	5,673	7,030	10,055	12,276	12,218
Standard Motors	3,559	1,098	2,774	2,345	1,405
	24,790	27,597	33,344	37,308	35,183

TABLE III.

VEHICLE PRODUCTION 1960—1969.

(1)	1960 (2)	1961 (3)	1962 (4)	1963 (5)	1964 (6)
Cars.					
Hindustan Motors	9,217	11,056	13,438	8,627	15,351
Premier Automobiles	6,516	7,197	6,247	3,750	3,867
Standard Motor Products	3,364	3,409	3,641	3,340	4,009
Total ..	19,097	21,662	23,326	15,711	23,227
Jeeps.					
Mahindra and Mahindra	5,501	7,052	7,552	8,104	10,391
Commercial Vehicles.					
Ashok Leyland (Diesel)	2,018	2,372	2,835	2,730	3,728
Bajaj Tempo (Diesel)	..	..	..	..	..
* Bajaj Tempo (Petrol)	600	793	850	888	1,688
Hindustan Motors (Diesel)	6,545	3,578	4,283	5,071	4,054
Hindustan Motors (Petrol)	534	518	664	744	886
Mahindra and Mahindra (Petrol)	1,429	852	679	307	45
Premier Automobiles (Petrol)	4,923	4,232	4,187	4,019	3,818
Premier Automobiles (Petrol)	1,424	1,295	1,199	2,297	4,931
Standard Motor Products (Petrol)	..	..	..	..	..
Telco (Diesel)	9,665	12,000	12,196	12,426	14,367
Total ..	27,138	25,640	26,893	28,482	33,517
Motor Cycles.					
Enfield India	3,998	4,682	5,309	4,723	4,948
Escorts	..	..	38	2,661	4,503
Ideal Jawa	..	3,954	3,481	2,072	4,407
Total ..	3,998	8,536	8,828	9,456	13,858
* *Scooters and Mopeds.*					
A.P.I.	10,813	11,613	11,090	9,671	12,097
Bajaj Auto	2,535	5,083	4,937	6,664	9,054
Enfield India	30	22	385	788	1,386
Escorts	..	..	..	..	..
Mopeds	..	..	..	..	..
Pearl	..	..	45	2	342
Saund	..	..	..	..	1,103
Total ..	13,378	16,718	16,457	17,125	23,982
Grand total ..	69,112	79,708	83,061	78,878	104,975

* Includin : 3 wheelers.

TABLE III—*cont.*

VEHICLE PRODUCTION 1960—1969—*cont.*

	1965	1966	1967	1968	1969
	(7)	(8)	(9)	(10)	(11)
Cars.					
Hindustan Motors	15,558	19,469	20,515	22,687	21,560
Premier Automobiles	5,673	7,030	10,055	12,276	12,218
Standard Motor Products	3,559	1,098	2,774	2,345	1,405
Total ..	24,790	27,597	33,344	37,308	35,183
Jeeps.					
Mahindra and Mahindra	10,488	9,777	5,561	7,293	7,838
Commercial Vehicles.					
Ashok Leyland (Diesel)	4,278	3,857	4,618	4,398	4,865
Bajaj Tempo (Diesel)	..	..	..	..	194
* Bajaj Tempo (Petrol)	1,681	1,562	1,665	1,641	2,384
Hindustan (Motors) Diesel	3,221	2,757	856	1,366	1,399
Hindustan Motors (Petrol)	1,634	1,344	679	615	437
Mahindra and Mahindra (Petrol)	..	982	1,047	1,453	1,482
Premier Automobiles (Petrol)	5,553	3,852	2,245	2,248	2,345
Premier Automobiles (Petrol)	3,533	923	831	1,107	1,218
Standard Motor Products (Petrol)	..	..	..	..	..
Telco (Diesel)	17,328	18,900	19,140	21,669	20,497
Total ..	37,299	35,156	31,454	34,940	35,242
Motor Cycles.					
Enfield India	5,769	6,359	6,462	9,002	9,772
Escorts	7,002	9,283	8,108	11,765	12,001
Ideal Jawa	8,593	9,398	8,768	8,644	12,704
Total ..	21,364	25,040	23,338	29,411	34,477
*Scooters and Mopeds.**					
A.P.I.	11,852	9,826	14,778	17,760	24,345
Bajaj Auto	8,878	11,084	18,670	21,964	30,000
Enfield India	1,803	1,952	1,050	545	377
Escorts	..	—	—	..	90
Mopeds	150	1,218	3,229	2,216	3,537
Pearl	1,676	923	472	1,373	1,059
Saund	5,265	2,950	5,206	5,959	6,447
Total ..	29,624	27,953	43,405	49,822	65,855
Grand total ..	123,565	125,523	137,102	158,744	178,595

* Including 3 wheelers.

TABLE IV.

TRACTOR PRODUCTION.

		1966 *Nos.*	1967 *Nos.*	1968 *Nos.*	1969 *Nos.*	1970 *Nos.*
(1)		(2)	(3)	(4)	(5)	(6)
Eicher Tractors Limited	12/18 Hp	18	..	..	..	..
	26/27 HP	106	92	204	352	378
Escorts Limited	28 HP	730	1,427	1,080	1,263	252
	35 HP	528	706	1,440	2,958	5,772
	48 HP	..	..	36	1,404	1,811
Hindustan Tractors Limited	35 HP	870	800	343	1,143	1,665
	50 HP	400	1,070	2,340	1,000	
International Tractors Co-operative India Limited.	35 HP	..	1,301	2,901	4,001	4,403
Tractors and Farm Equipment Limited.	35 HP	3,066	3,397	4,087	3,275	2,818
Figures as of end March	Total ..	5,718	8,793	11,431	15,396	17,099

STATE-WISE DISTRIBUTION OF TRACTOR POPULATION.

States.	1968.	1969 *
Andhra Pradesh	3,008	3,700
Assam	879	1,000
Bihar	2,426	2,850
Gujarat	5,981	6,750
Haryana	6,321	8,050
Jammu and Kashmir	109	150
Kerala	1,017	1,250
Madhya Pradesh	3,182	3,300
Madras	5,110	5,550
Maharashtra	4,919	5,550
Mysore	3,563	5,200
Orissa	948	1,100
Punjab	12,847	17,850
Rajasthan	4,800	5,700
Uttar Pradesh	13,225	14,950
West Bengal	2,343	3,550
Union Territories	1,298	1,400
Total ..	71,976	87,900

Figures as available on March, 1970.

* Estimated.

TABLE V.

AUTOMOBILE ANCILLARY INDUSTRY GROWTH 1961–1970.

(*Value in Millions of Rupees*)

(1)	1961 (2)	1962 (3)	1963 (4)	1964 (5)	1965 (6)
Engine Parts	73	81	104	139	176
Electrical Parts	5	7	10	22	40
Drive, Transmission and Steering Parts.	7	9	26	54	78
Suspension and Braking Parts	30	36	51	74	93
Equipment	6	8	12	21	28
Chassis and Body Parts	6	7	12	13	19
Miscellaneous	19	30	45	50	63
Total	146	178	260	373	497

(*Value in Million of Rupees*)

	1966 (7)	1967 (8)	1968 (9)	1969 (10)	1970 (11)
Engine Parts	212	261	291	327	408
Electrical Parts	55	65	64	81	86
Drive, Transmission and Steering Parts	101	122	129	164	195
Suspension and Braking Parts	118	173	174	195	235
Equipment	29	38	44	52	54
Chassis and Body Parts	25	34	32	32	55
Miscellaneous	74	127	108	110	144
Total	614	820	842	961	1,177

TABLE VI.

ESTIMATED DEMAND AND PRODUCTION TARGET FOURTH FIVE-YEAR PLAN 1969–70 TO 1973–74.

Type of Vehicles.	*Fourth Five-Year Plan Period.*					
	1969–70	1970–71	1971–72	1972–73	1973–74	*Total.*
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Commercial Vehicles (Heavy and Medium)	42,000	49,000	57,000	66,000	75,000	279,000
Commercial Vehicles—Light	6,000	7,000	8,000	9,000	10,000	40,000
Cars	45,000				75,000	120,000
Jeeps	11,000	12,000	13,000	14,000	15,000	65,000
Two and Three Wheelers	106,000	132,000	158,000	184,000	210,000	790,000
Ancillaries (Rupees in Million)	800	950	1,150	1,400	1,700	6,000
Auto Cycles		50,000	100,000	175,000	250,000	575,000
Tractors	36,000	42,000	49,000	58,000	68,000	253,000
Power Tillers	20,000	30,000	40,000	50,000	60,000	200,000
Station Engines	365,000	430,000	510,000	600,000	700,000	2,605,000
Kerosene/Petrol Engine	45,000	60,000	85,000	110,000	135,000	435,000
Earth Moving Equipments, etc.	1,200	1,700	2,700	2,900	3,000	11,500

TABLE VII.

AUTOMOBILE AND ALLIED INDUSTRIES IN TAMIL NADU.

(All figures are in unit numbers unless otherwise stated).

Product.	*Licensed Capacity.*		*Production in 1971.*	
	All-India.	*Tamil Nadu.*	*All-India.*	*Tamil Nadu.*
(1)	(2)	(3)	(4)	(5)
Vehicles:				
Cars	20,200 (3)	3,000 (1)	38,313	827
Commercial Vehicles	76,000 (7)	13,000 (2)	41,857	5,722
Vehicular Diesel Engine	10,000 (1)	10,000 (1)	2,167	2,167
Jeep	15,000 (1)	Nil.	11,053	Nil.
Two and Three Wheeler	104,300 (8)	12,800 (1)	127,241	10,854
Tractors	78,000 (11)	7,000 (1)	22,038	4,321
Auto-Ancillaries.				
Pistons	2,520,000 (3)	1,500,000 (1)	1,714,422	859,446
Piston Rings	165,00,000 (3)	9,000,000 (1)	180,51,464	6,099,195
Piston Pins	2,610,000 (3)	1,650,000 (1)	1,571,134	770,274
Cylinder Liners	792,000 (4)	360,000 (1)	255,594	230,384
Engine Valves	7,900,000 (4)	5,000,000 (1)	4,254,275	2,702,048
Carburettors	196,000 (4)	20,000 (1)	41,553	36,305
Fuel Pump (Petrol)	160,000 (3)	12,000 (1)	49,460	34,445
Flywheel Ring Gears	102,000 (1)	102,000 (1)	86,807	86,807
Radiators	111,200 (7)	38,200 (3)	127,403	53,040
Thinwall Bearings	1,720,000 (3)	1,120,000 (2)	8,476,558	4,956,558
Starter Motors	159,000 (4)	122,000(2)	141,698	117,367
Generators	175,000 (4)	126,000 (2)	138,416	110,319
Voltage Regulators	263,000 (6)	128,000 (2)	241,434	161,989
Electric Horns	525,000 (8)	160,000 (2)	312,951	164,616
Clutch Assembly	230,720 (4)	108,720 (1)	131,338	3,258
Clutch Plates	631,680 (6)	235,680 (2)	320,345	26,921
Tie Rod Ends	1,484,000 (4)	1,000,000 (1)	959,736	360,000
Hydraulic Brake Assy.	126,000 (2)	96,000 (1)	95,971	57,951
Air Brake Assy.	96,000 (1)	96,000 (1)	32,494	32,494
Shock Absorbers	1,800,000 (4)	200,000 (1)	1,303,483	181,160
Wheels	620,000 (2)	320,000 (1)	656,906	307,973
Bus Bodies	17,150 (23)	2,016 (5)	..	..

TABLE VII—*cont.*

AUTOMOBILE AND ALLIED INDUSTRIES IN TAMIL NADU—*cont.*

(*All figures are in unit numbers unless otherwise stated*)—cont.

	Letters of intent.		*Share of Production in Tamil Nadu as Percentage of All-India.*	*Estimated Demand All-India 1973–74.*
	All India.	*Tamil Nadu.*		
	(6)	(7)	(8)	(9)
Vehicles:—				
Cars	1,65,000 (6)	10,000 (1)	2·2	75,000
Commercial Vehicles	24,000 (2)	Nil.	13·7	85,000
Vehicular diesel Engine	..	..	100·0	..
Jeep	Nil.	Nil.	..	15,000
Two and Three Wheeler	5,34,000 (23)	96,000 (4)	8·5	2,10,000
Tractors	60,000 (7)	Nil.	19·6	68,000
Auto Ancillaries:—				
Pistons	77,88,000 (17)	8,00,000 (2)	50·1	52,00,000
Piston Rings	6,41,50,000 (19)	64,00,000 (2)	33·8	3,80,00,000
Piston Pins	73,90,000 (19)	8,50,000 (2)	49·0	52,00,000
Cylinder Liners	6,50,000 (4)	1,00,000 (1)	86·7	..
Engine Valves	3,83,80,000 (17)	24,00,000 (2)	63·5	1,20,00,000
Carburettors	8,00,000 (12)	Nil.	87·3	7,50,000
Fuel Pump (Petrol)	40,000 (1)	Nil.	69·5	1,20,000
Flywheel Ring Gears	2,00,000 (2)	Nil.	100·0	3,00,000
Radiators	..	..	41·6	3,00,000
Thinwall Bearings	..	..	58·5	60,00,000
Starter Motors	1,33,000 (3)	Nil.	82·9	3,00,000
Generators	1,77,000 (3)	Nil.	79·7	3,00,000
Voltage Regulators	3,21,000 (4)	Nil.	67·1	6,50,000
Electric Horns	..	..	52·6	10,00,000
Clutch Assembly	10,000 (1)	Nil.	2·5	5,50,000
Clutch Plates	90,000 (2)	Nil.	8·4	6,70,000
Tie Rod Ends	36,000 (1)	Nil.	37·5	15,00,000
Hydraulic Brake Assy	..	..	60·4	9,00,000
Air Brake Assy	40,000 (1)	Nil.	100·0	82,000
Shock Absorbers	15,08,000 (5)	Nil.	13·9	30,00,000
Wheels	7,95,000 (2)	Nil.	46·8	17,20,000
Bus Bodies	..	..	..	..

Note:—(1) Figures in brackets show the number of units.

(2) The total production of auto-ancillaries in Tamil Nadu during 1970–71 is 36·2 crores rupees, i.e. 30 per cent of All-India Production. The ancillary production does not include production of tyres and tubes, batteries upholstery, paints, ball and roller bearings and general hardware. The value of production of engines by Simpsons and other ancillaries produced in vehicle assemblers' plants are also not included.

(3) Items not produced in Tamil Nadu :—

(i) Gaskets.

(ii) Fuel Injection Equipment.

(iii) Spark Plugs.

(iv) Steering Wheels.

(v) Transmission Gears.

(vi) Axle Shafts.

(vii) Steering Gears.

(viii) Panel Instruments.

(ix) Tipping Gears.

(x) Fuel & Oil Lines.

(4) All data given above pertains to only units registered with DGTD. The figures are as available on 31st January 1972.

CHAPTER VII.

Chemicals and Allied Industries.

1. Chemical industries are one of the most vital components for any nation's economy and their State of development is an index of the progress achieved by a country. For the rapid industrialisation of a developing country like India, the promotion of chemical industries cannot be over-emphasised. Also, the production of chemicals is essential for the manufacture of various products such as textiles-rayon, rubber, paper, glass and ceramics, soap, fertilizers and insecticides, dyestuffs and intermediates, drugs and plastics vegetable and animal and petroleum refining.

2. *Growth of the Industry.*

2.1. The history of the growth of chemical industries is one of steady progress from an infant stage over two decades ago, to an impressive stature. The attainment of independence and adoption of planning created the proper climate for a rapid development of this industry. Several branches of this industry got established during this period and drew up schemes for development. The progress made by the heavy chemical industry has been largely through private initiative, although a proportion of the capital expenditure has been provided as loans by the Industrial Finance Corporation of India. New products are being added continuously to the list of chemicals manufactured in the country such as benzene, hexachloride, D.D.T., Hydrogen peroxide, ammonium chloride, calcium carbide and stable bleaching powder.

2.2. There are two outstanding producers of Caustic Soda, Chlorine and Chlorine Chemicals and Pesticides. Dharangadara Chemical Works Limited, at Sahupuram has expanded its activities considerably over a period and has now a capacity of producing 140 tonnes of caustic soda daily along 60 tonnes of Liquid chlorine, 130 tonnes of Hydrochloric acid, 15 tonnes of Trichloro-ethylene, 15 tonnes of Pechloroethylene and 100 tonnes of beneficated ethylene. There is a proposal for expanding the capacity of caustic soda plant to 180 tonnes which will result in a corresponding increase in the availability of chlorine and allied products. Actually, for ensuring better utilisation of chlorine, a sister unit for manufacturing PVC based on Naphtha has been started with Japanese collaboration. This unit of Plastics, Resins and Chemicals Limited, which started functioning in the middle of 1972 has an annual capacity of 12,000 tonnes of Polyvinyl Chloride.

2.3. The other important producer of Caustic Soda, the older entrant in the field, is the Mettur Chemicals and Industrial Corporation Limited. There are two units for producing Caustic Soda in Mettur, one exclusively for rayon grade caustic soda. The capacity of these two units is 120 tonnes daily. There is also a large-sized plant for manufacturing Chloromathene. Surplus quantities of chlorine are being supplied to the adjacently located plant of Chemicals and Plastics India Limited which is producing PVC based on alcohol. The capacity of this unit has recently been expanded to 12,000 tonnes annually. There is also another unit in the same area under different auspices for producing Benzene hexochloride. The capacity of the caustic soda plant is being increased by 20 tonnes at Mettur and there is a proposal for expanding it further by 40 tonnes.

2.4. The only unit for manufacturing Calcium Carbide is producing 10,000 units annually at Sankaranagar in Tirunelveli District. There are no immediate plans for expanding capacity in spite of an unsatisfied demand for this chemical.

3. *Man-made Fibres.*

3.1. With regard to the manufacture of man-made fibres, it can be said that Tamil Nadu has just made a beginning. A rayon factory of South India Viscose for the manufacture of 4,000 tonnes per year of staple fibre and 4,000 tonnes of rayon was set up in 1961 at Sirumugai, near Mettupalayam, based on imported wood pulp. This unit has set up a new pulp plant with a capacity of 21,000 tonnes per year with plans to go upto 30,000 tonnes annually. Further expansion is contemplated for staple fibre.

4. *Fertilizers.*

4.1. In the field of Chemical Fertilizers the first large sized unit for manufacturing urea based on lignite commenced working in Neyveli in 1965 with a capacity of 500 tpd. Parry & Co., which has been marketing fertilisers, for nearly over 60 years, put up a plant in 1962 at Ennore for the manufacture of Ammonium Phosphate/sulphate. This plant had an original capacity of 51,000 tonnes per year of phosphate/sulphate and has recently expanded to make, in addition, 38,000 tonnes per annum of ammonium sulphate using the waste gypsum available from the phosphoric acid plant as the raw material. The Neyveli and Ennore Plants are comparatively small. The present trend is to set up fertiliser plants to manufacture as much as 1,000 tonnes per day of ammonia in a single stream. Hence, the Government of India in collaboration with an American Oil Company set up a giant plant at Madras adjacent to the Oil Refinery at Manali with a rated capacity of 1,000 tonnes per day of Ammonia and 885 tonnes per day of urea and 1,200 tonnes per day of complex fertilisers (NPK).

5. *Petro-Chemicals.*

5.1. Impressive progress has been made in the development of a Petro-Chemical in the Manali area with the establishment of an oil refinery having a capacity of 2·5 million tonnes of crude per year with plans to produce various grades of fuels and lubricants. In order to process the base stocks of the oil refinery a lube blending plant of Indian Oil Corporation is functioning in the complex while Nagpal Petrochem Refining has its unit for producing transformer oil and speciality products with U.S. Technical Collaboration. A new unit for manufacturing Polyster Fibre was completed in the third quarter of 1972 with U.S. Technical Collaboration. The scheme for manufacturing Carbon Black by Kamanis with the help of feed-stock from oil refinery is in the blue print stage.

5.2. Another Petro-Chemical Complex is coming up in the Tuticorin area with the biggest Fertiliser Plant of Southern Petro-Chemical Industries Corporation under construction. The capacity of Ammonia Plant will be 1,100 tonnes daily and the main units are expected to be ready by the middle of 1974. Many allied and down stream units for producing heavy-water, Caustic Soda, Ammonium Chloride and other items will also come into being in the next five years.

6. *Petro-Chemicals in Tamil Nadu.*

6.1. The scope for the development of Chemical Industries in Tamil Nadu appears to be very bright. The Imperial Chemical Industries has proposed a $\frac{1}{2}$ million tonne of naphtha cracker and also plans to produce ethylene, poly-propylene and butadiene near the Madras Refinery. The scheme has left the door open for the addition of more down-stream units.

6.2. The Engineers India Limited has submitted a report proposing four alternative schemes with different Naphtha Cracker capacities. The first scheme is for 212,000 tonnes a year at an estimated cost of Rs. 55·5 crores. The second scheme envisages a capacity of 352,000 tonnes at a cost of Rs. 96·65 crores; the third scheme 420,000 tonnes at a cost of Rs. 117·38 crores and the fourth 60,000 tonnes with Rs. 21·63 crores. The downstream units, which have been suggested to use the basic petro-chemicals are LD Polythene, PVC, polystyrene, ethylene glycol and S.B. Rubber.

6.3. On the basis of these recommendations the Tamil Nadu Government is contemplating to set up a Naphtha Cracker Plant at Manali at an outlay of Rs. 90 crores to produce 20,000 tonnes of Butadiene, 90,000 tonnes of Gasolene, 150,000 tonnes of Ethylene, 140,000 tonnes of LD polythene and 40,000 tonnes of Polypropylene. When these basic raw materials are produced, numerous downstream units can automatically take off and consequently set a foot a spin-off effect on the investment pattern in the State.

6.4. The Nylon Tyre Cord Unit of DCM with a proposal to produce 4,500 tonnes of Nylon Tyre Yarn is the third private sector unit expected to function in the Manali Complex.

6.5. The TIDCO has received a letter of intent for a Nylon Textile Filament Yarn Unit to be set up in Madurai district under the State Sector. The sanctioned plant is for manufacturing 2,100 tonnes per annum of Nylon Textile Filament. The capital cost of the project will be around Rs. 10 crores.

6.6. In the Tuticorin Petro-Chemical Complex there is a scheme for locating an oil refinery with a large capacity of 5 million tonnes. If this project fructifies, it will be possible to meet the needs of Naphtha for the Fertilizer Plant besides helping also the formation of many downstream units. The quantities of fuel oil may at the same time be useful for the thermal station proposed to be started in the same centre.

6.7. There are many gaps in the Petro-Chemical Sector and with the functioning of a Naphtha Cracker Plant and the availability of basic raw materials, there is scope for undertaking the production of synthetic rubber. The output of natural rubber alone will be inadequate to meet the requirement of a growing tyre industry.

7. *Tyres.*

7.1 The tyre industry is well developed and there are at present two units operating in the State. The large sized factory of Madras Rubber Factory Limited started in 1962, has a capacity of 6·1 lakh sets of tyres and tubes annually and a complete range of products is being turned out. There is also a scheme for manufacturing 2 million cycle tyres.

7.2. The Ambattur Unit of Dunlop India Limited, has a capacity of 4 lakh sets of tyres and tubes apart from 2 million cycle tyres. The arrangements for starting a third unit with an initial capacity of 3 lakh tyres and tubes are being finalised and the plant will be located at Thirupathur in Ramanathapuram district.

7A. *Pharmaceuticals.*

There has been no worthwhile progress in the manufacture of pharmaceutical products. A scheme for turning out special drugs by Alkali and Chemical Corporation, an associate of ICI of UK, in the Manali Complex, is yet to take shape. There are, of course, some processing units which have no large stature. The unit of Indian Pharmaceuticals and Chemicals in the Central Sector has been manufacturing surgical instruments with Russian collaboration at Nandampakkam in Madras. This plant produces intrautrine contraceptive devices and vasectomy instruments.

8. *Scope for future Development of Chemicals and Allied Industries.*

8.1. The scope for further development is vast and varied. The abundant salt resources can be utilised for producing larger quantities of caustic soda, soda ash and various other chemicals. The capacity of the Madras Oil Refinery will have to be considerably expanded significantly for meeting the increasing demand for acetylene gas that will arise with the faster development of Engineering Industries. There will necessarily have to be a bigger output of Polyester Fibre, Nylon Filament Yarn, raw materials like Ethyl Glycol, DMT and Caprolactum and intermediate products, for dyestuffs and pharmaceuticals. It may appear that the Fertilizer Industry has grown to the required stature and there is no immediate need for fresh capacity in this direction. But with new demands and better lift irrigation facilities, the consumption of fertilizers may increase to such an extent that the picture may change and the creation of new capacity, either in the existing units, or, by promoting new units, may have to be contemplated. The output of cellulosic fibres and cellulosic film will have to be stepped up after undertaking measures for ensuring regular and adequate availability of raw materials.

9. *Recommendations.—The Task Force recommends* :

9.1 The manufacture of such items as Ethylene Oxide, Ethylene Glycol, Ethyl Amines, Ethyl Benzene, Nitro Benzene, Aniline, Dodecyl Benzene, Phenols, Maleic Anhydride, Tolune, TNT, Xylene, Ortho Meta and Para Mylenes, Phthalic Acid and Phthalic Anhydride, would depend upon the size of the naphtha cracker chosen as well as on the availability of the various other raw materials. Economic production of these chemicals can be done only when petro-chemical raw materials are available. A high level of output of organic chemicals is also necessary for the growth of man-made fibre industry, dyestuffs, pharmaceuticals and fine chemicals and insecticides. The approximate capital investment in starting an Organic Chemical project will be of the order of Rs. 50 crores.

9.2. The capacity of the Madras Refinery should be increased to four million tonnes.

9.3. Early decision should be taken about setting up a large size cracker in the Madras area for producing substantial quantities for Polyethylene, PVC, Polystyrene, Ethylene Glycol and SBR.

4. The refin ery schemes proposed for the Tuticorin area for upgrading crude oil for the manufacture of substantial quantities of naphtha should be seriously pursued.

9.5. The major inorganic chemicals, production of which already exists in our State are Caustic Soda, Chlorine, Ammonium Chloride, Bleaching Powder and Sulphuric Acid. It is suggested that Caustic Soda Production should be doubled in the next 10 years. The basic technology would still be electrolytic and it will also make available a large quantity of chlorine which in turn should be used in the manufacture of various organic chemicals.

9.6. A Plant with a minimum capacity of five tonnes per day for Caustic Potash should be set up as an adjunct to one of the existing Electrolytic Caustic Soda Plants either in Mettur or Tuticorin in view of the demand for Potassium Carbonate and Potassium Hydroxide from various industries including fertilizers.

9.7. There is no Soda Ash Plant in the State even though it has abundant salt resources. The letter of Intent of TIDCO should be used for starting a Plant with a daily capacity of 400 tonnes of Soda Ash and 400 tonnes of Ammonium Chloride as an ancillary product. Such a plant will be economically viable and investment involved will be in the neighbourhood of Rs. 10 crores.

9.8. Recovery of Potassium and Magnesium Sulphate from Salt may be considered for use in mixed fertilizer manufacture.

9.9. Substantial increase in the production of good quality salt in the Tuticorin and Vedaranyam areas should be planned. Salt factories should be encouraged to effect maximum recovery of by-products like Gypsum, Pottassium Chloride, Bromine and Light Magnesium Carbonate.

9.10. Production facilities should be set up early for the manufacture of metallic Sodium and also metallic Magnesium and elemental Phosphorus. In the case of elemental Phosphorus, it will have to be based on imported rock phosphate. A plant for the production of metallic magnesium of reasonable capacity should be set up. Already, the Government of Tamil Nadu has sponsored a pilot plant project in the CECRI, Karaikudi and work on this should be completed early.

9.11. The Project of TIDCO for setting up a plant near Melur in Madurai district for the manufacture of Potassium Chlorate at a cost of Rupees one crore with a capacity of 1,825 tonnes annually should be expedited.

9.12. A plant contemplated by TIDCO for the manufacture of 15,000 tonnes Borax and 3,000 tonnes of Boric Acid per annum at an estimated cost of Rs. 85 lakhs should be taken up in the Fifth Plan.

9.13. A unit to be set up for the manufacture of Sodium Hydrosulphite near Karaikudi in Ramanathapuram district at a cost of Rs. 3 crores with an annual capacity (i.e.) 3,300 tonnes.

9.14. Inorganic chemicals such as Sodium Dichromate, Chromic Acid, Aluminium Chloride, Zinc Chloride, Zinc Oxide, Titanium Chloride and Titanium White should be manufactured. It is suggested that Ilmenite Ore, which is rich in Titanium Mineral, will

have to be utilised to prepare Titanium Chloride and Titanium Dioxide (White). Also the State's resources of Manganese Dioxide should be utilised to make Manganese Salts which have industrial importance.

9.15. Substantial amount of industrial alcohol should be made available to the chemical industry to manufacture those chemicals for the development of small scale chemical industries which could cater to the needs of Fine Chemicals, Cosmetics, Dyestuff and Intermediates. This includes the manufacture of Acetic Acid, Acetic Anhydride, Chloracetic Acid, Ethyl Acetate, Phenyl Acetic Acid, Benzyl Acetate, Benzyl Alcohol and Ether. Hence, new distilleries should be established for utilising increasing quantities of molasses for producing industrial alcohol. The larger requirement of plastic units and for potable purposes can then be met.

9.16. It has been suggested in the past that in view of the estimated demands for high temperature coke, of the order of more than 150,000 tonnes per annum, the setting up of a coke oven plant is justifiable. For a capacity of about 200,000 tonnes of coke per annum, the investment is estimated at about Rs. 5 crores. The project will give valuable by-products which can be utilised for the organic chemical industrial development in the State like Ammonium Sulphate, Benzene, Tolune, Naphthalene, Anthracene, pitch and coke bricks.

9.17. Additional quantities of BHC are needed and the new units can be installed besides increasing the capacity of the existing plants. The required quantity of chlorine will be available with an increase in the output of Caustic Soda.

9.18. Plants for the manufacture of carbaryl, endrin, parathion, melathion, zinc phosphate, etc., should be set up in view of the low installed capacity at present for these items.

9.19. The Nylon Tyre Cord Project planned in the area should be expedited.

9.20. A Nylon Textile Filament Unit with a capacity of 2,100 tonnes annually of Nylon Textile Filament to be set up at Madurai.

9.21. Substantial expansion of existing production facilities for Viscose Staple Fibre should be encouraged.

9.22. Raw material supply for the fibre production is very important. For this purpose, Government should increase the area under cultivation for Eucalyptus and Wattle.

9.23. The project for polyamide production, for which Tamil Nadu State Industrial Corporation holds a Letter of Intent, should be expedited.

9.24. Caprolactum should be planned for manufacture in the proposed petro-chemica complexes.

9.25. DMT, which is raw material for polyester manufacture, should be included in the petro-chemical programme of the State.

9.26. A small or medium size plant should be established for the manufacture of Nitric Acid. For this purpose, it would be desirable that Ammonia be made available at

economical cost or at the cost of manufacture by the fertilizer industry by installing a separate Ammonia Plant. Such a plant for the manufacture of Nitric Acid could be set up at the Madras Fertilizers Limited.

9.27 Assistance should be given to the expansion of Super Phosphate Plants by supply of di or mono-ammonium phosphate to enable them to operate their plants and upgrade their production. It is not desirable to keep the existing capacity idle.

9.28 The Joint Sector unit proposed for Ramanathapuram for the manufacture of rubber tyres should be vigorously implemented.

9.29 Where possible, expansion of existing tyre production facilities in the State should be considered and approved.

9.30 Tamil Nadu should take interest in the promotion of a big vinyl Monomer Plant in order to be able to produce plastics at a reasonable cost.

9.31 The activities of CIPET* for providing the necessary equipment to small entrepreneurs for manufacturing plastic products should be expanded.

9.32 The proposal of the Ministry of Petroleum and Chemicals for establishing a big unit for the production of 'Monomers' an essential raw material needed for PVC production should be modified for promoting two units with a capacity of 60,000 tonnes each and one of these can be located in Tamil Nadu.

9.33 It is necessary that a broad-based unit like the Hindustan Organic Chemicals is considered for being set up in Tamil Nadu to meet the requirements of Dye Intermediates. This should be quite feasible when it is made part of the larger petro-chemical complex for the South.

9.34 In view of the acute shortage of dyestuff intermediates, as an intermediate short-term project, production of even two items like aniline and H-acid for naphthol may be planned for the State.

9.35 Manufacture of Bisphenol A. 2, 4-D type weedicide and salicylic acid is feasible and units for the same may be set up at Neyveli.

9.36 A large-sized pharmaceutical unit should be located in the Manali comple at a cost of Rs. 10 crores for producing a wide range of broad spectrum of antibiotics, special drugs and fine chemicals based on petro-chemical intermediates and other raw materials.

9.37 Production of phyto-chemicals like dioxgin from digitalis, alkaloids from Belladonna, Biogenin from Discoria and Soldsidin from Solenium.

9.38 Manufacture of caffeine from Tea Waste and Sodium Aliginate from sea-weeds be taken up.

9·39 Production of Anti-serum should be increased considerably.

---

* Central Institute of Plastics Engineering and Tools.

587C—59—7A

CFTRI LIBRARY 209(b) 15-4-74 MYSORE

TABLE I.

Capacity for petro-chemicals manufacture.

	Capacity installed approved.	*Koyali complex.*	*Total capacity, 1973–74.*	*Estimated, 1973–74.*	*Demand, 1978–79.*
(1)	(2)	(3)	(4)	(5)	(6)
Basic—					
Ethylene	106,000*	100,000	206,000	*	..
Propylene	41,000	46,000	87,000	..	..
Butadiene	30,000	15,500	45,500	..	..
Benzene	81,000	15,500	96,500	..	..
O. Xylene		21,000	21,000		
P. Xylene		17,000	17,000		
Plastics—					
Polyethylene Low Density	25,000	40,000	65,000	58,000	115,000
High Density	24,000	..	24,000	23,000	45,000
P. V. C.	92,000	..	92,000	80,000	175,000
Polystyrene and Styrene Copolymers ..	23,100	16,000	39,100	35,000	70,000
Polypropylene	..	10,000	10,000	7,000	15,000
Synthetic Fibres—					
Polyster	24,400	..	24,400	36,500	76,000
Nylon	25,000	..	25,000	13,000	69,000
Acrylics	4,600	7,500	12,100	12,000	18,000
Polypropylene	..	5,000	5,000	3,000	10,000
P.V.A.	..	12,000	12,000	16,000	14,000
Synthetic Rubber—					
S.B.R.	30,000	..	30,000	..	30,000
Polybutadiene	..	20,000	20,000	20,000	40,000
Butyl	..	..	..	30,000	80,000
Intermediates—					
D. M. T.	..	24,000	24,000	49,000	75,000
Caprolactum	22,000	..	22,000	36,000	75,000
Ethylene Glycol	10,000	..	10,000	14,000	30,000
Acrylonitrile	..	16,000	16,000	15,000	24,000
Vinyl acetate	..	30,000	30,000	25,000	40,000
Phthalic Anhydride	18,600	..	18,600	22,000	60,000
Phthalates	31,000	..	31,000	..	..
Methyl metha acrylate	5,000	..	5,000	4,000	..
Ethylene Oxide	12,000	..	12,000	15/16,000	..
Butyl and Isobutyl Alcohol	14,000	..	14,000	12,000	..
2—Ethyl Hexanol	11,000	..	11,000	24,000	..
Phenol	17,000	..	17,000	17,000	30,000
Detergent Alkylate	28,000	..	28,000	22,000	40,000

* Includes 29,000 alcohol based.

TABLE II.

PERCENTAGE OF SYNTHETIC FIBRE PRODUCTION IN TOTAL PRODUCTION OF FIBRES.

Year.	*World.*	*India.*
1962	7	0·02
1963	8	0·08
1964	9	0·10
1965	11	0·30
1966	14	0·45
1967	16	0·50
1968	19	0·91
1969	21	1·27
1970	23	Not available.

(*Source* : Dr. S. R. Vengar Sarkar—"Apparel : Growing field for Synthetic fibres" Silk Rayon Industries of India —June 1970 CIRFS 1971).

World Situation—

The following is the world production of Synthetic yarn and Staple Fibre :—

(IN '000 TONNES.)

Year.	*Synthetic.*	
	Filament yarn.	*Fibre.*
(1)	(2)	(3)
1950	54	15
1951	76	26
1952	91	37
1953	113	45
1954	140	53
1955	183	82
1956	200	107
1957	253	154
1958	268	150
1959	352	225
1960	417	285
1961	496	332
1962	637	442
1963	777	552
1964	978	709
1965	1,116	921
1966	1,341	1,125
1967	1,507	1,352
1968	1,954	1,814
1969	2,245	2,135
1970	2,493	2,424

(*Source* : CIRFS—1961.)

TABLE III.

PROJECTIONS OF DEMAND AND PRODUCTION.

(Quantity in '000 tonnes.)

Name of the plastics.	*Estimated demand by 1973–74.*	*Estimated production by 1973–74.*	*Capacity required to achieve this production by 1973–74.*
(1)	(3)	(4)	(5)
I. THERMOPLASTICS.			
L. D. Polyethylene and copolymers (HP)	60	60	70
H. D. Polyethylene and copolymers (L.P.)	25	31	31
Polyethylene and copolymers (I.P.)	(5)	(7)	(14)
Polyprophylene	10	10	15
PVC and copolymers	70–80	80–90	100
Methyl methacrylate	4–5	5	5
Acrylic acid esters	1–2	2	3
Vinyl acetate dispersions	5	5	6
Polystyrene including foams	30	30	40
Styrene copolymers	4	4	4
Polyurethane (Polyurethane eq)	15 (for all foams)		
Cellolose acetate (flakes eq)	4	4	4
Cellulose acetate butyrate (flakes eq)	1	..	..
Cellulose nitrate (flakes eq)	(3)	..	..
Silicones (polymers)	0·2	0·2	0·2
Fluorinated ethylene polymers	1·6	1·6	4
Nylon	0·6	0·6	1
Others—Polyacetals, Polycarbonates, Poly-phenylene oxide, etc.	1	..	..
II. THERMOSETS.			
Urea-formaldehyde resin	10	10	11
Urea-formaldehyde MP	3·4	3·4	3·6
Phenol-formaldehyde resins	5·5	5·5	6
Phenol-formaldehyde MP	7·8	7·8	7·8
Melamine-formaldehyde resins	1·4	1·4	1·4
Malamine-formaldehyde MP	1·5	1·5	1·5
Polyester	2·5	2·5	2·5
poxy	1·2	1·2	1·2

TABLE IV.

WORLD SYNTHETIC FIBRE PRODUCTION AND PRODUCING CAPACITY.

(In million Kilograms)

Year.	*Acrylic + Mod-acrylic*			*Nylon*		
	Filament yarn.	*Staple*	*Total*	*Filament yarn.*	*Staple*	*Total.*
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1959	..	90	90	304	44	348
1960	..	109	100	356	..	406
1961	1	121	122	421	58	479
1962	1	163	164	542	67	609
1963	2	209	211	657	84	741
1964	2	298	300	809	92	901
1965	3	401	404	909	112	1,021
1966	2	455	457	1,087	127	1,214
1967	3	537	540	1,183	133	1,316
1968	4	733	737	1,458	167	1,625
1969 Percentage of total.	..	19·6	19·6	36·5	4·5	41·0
Producing Capacity—						
1970	6	1,163	1,169	2,076	260	2,336
1971	11	1,424	1,435	2,436	285	2,721

Year.	*Polyester.*			*Others.*		
	Filament yarn.	*Staple*	*Total.*	*Filament yarn.*	*Staple.*	*Total.*
	(8)	(9)	(10)	(11)	(12)	(13)
1959	27	60	87	20	31	51
1960	39	84	123	22	42	64
1961	48	103	151	27	52	79
1962	60	148	208	35	64	99
1963	76	187	263	44	74	118
1964	107	231	338	60	92	152
1965	137	320	457	77	91	168
1966	162	427	589	104	118	222
1967	218	538	756	120	139	259
1968	337	739	1,076	179	163	342
1969 Percentage of total.	10·5	19·5	31·0	4·2	4·2	8·4
Producing Capacity—						
1970	639	1,244	1,883	309	263	572
1971	976	1,565	2,541	386	289	675

TABLE IV—*cont.*

WORLD SYNTHETIC FIBRE PRODUCTION AND PRODUCING FACTORY—*cont.*

(In million Kilograms).

Year.	*All fibres.*			*Percentage.*	
	Filament yarn.	*Staple.*	*Total.*		
	(14)	(15)	(16)		(17)
1959	351	225	576		
1960	417	285	702	(+)	21·9
1961	497	334	831	(+)	18·4
1962	638	442	1,080	(+)	30·0
1963	779	554	1,333	(+)	23·4
1964	978	713	1,691	(+)	26·8
1965	1,126	824	2,050	(+)	21·2
1966	1,355	1,127	2,482	(+)	21·1
1967	1,523	1,348	2,871	(+)	15·7
1968	1,978	1,802	3,780	(+)	31·0
1969 Percentage of total.	51·5	48·5	100		..
Producing Capacity.—					
1970	3,029	2,930	5,960		
1971	3,808	3,563	7,371		

(*Source* : Silk and Rayon Industries of India, November 1970).

CHAPTER VIII.

Cement and Allied Industries.

1.1 The Cement Industry is well established and one of the traditional industries in the country. The production capacity of the industry as on 31st August 1970 stood at 19·55 million tonnes annually. The Industry has grown rapidly in the Southern and Western regions of the country due to the availability of large quantities of the basic raw material, viz., limestone in these regions.

1.2 The region-wise production capacities in the country are as under :—

	Annual Capacity in lakh tonnes.
South	72·23
West	56·22
North	34·17
East	32·89
	195·51

1.3 The Industry has also made rapid strides in Tamil Nadu. The present production capacities of the various factories in the State are as under :—

Name of the Company.	*Location.*	*Capacity.* (LAKH TONNES.)
The India Cements Limited	Sankar Nagar (Talaiyuthu). ..	9·13
	Sankaridrug	6·00
A.C.C.	Madukkarai	3·84
Tamil Nadu Cements	Alangulam	4·00
Dalmia Cements	Dalmiapuram	5·25
Chettinad Cements	Karur	4·00
Madras Cements	Tulukkapatti	1·90
		34·12

1.4 Thus, the production capacity in our State accounts for about 47 per cent of the capacity in the South Zone and for more than 17 per cent of the total production capacity in the country.

1.5 During the year 1970 the production of cement in Tamil Nadu was 23·88 lakh tonnes contributing to about 45 per cent of the production in the Southern Region and about 17 per cent of the total production in the country. Against this, the total consumption of cement in the State during 1970 amounted to only 12·15 lakh tonnes, the

net per capita consumption being 30·71 kgs. as against a per capita consumption of 48·03 kgs. in Gujarat, 43·88 kgs. in Punjab and 42·28 kgs. in Haryana and an all-India average of 24·61 kgs. Thus, it would seem that there is a lot of scope for improvement in the per capita consumption of cement in a developed State like Tamil Nadu. A large proportion of the Cement produced in the State is at present being utilised to meet the demand in other States of the zone and also to meet the demand in other deficit areas in the North and East zones. In fact, the whole of the South zone is a surplus zone with the surplus being siphoned off to meet the unsatisfied demand in other areas of the country. Thus in 1970 factories situated in the South zone despatched 12·56 lakh tonnes of cement to the West, 2·99 lakh tonnes of cement to the East and 3·28 lakhtonnes of cement to areas in the North of the country. Such free movement of cement to scarcity pockets in the country has been made possible by the freight pooling system that is in vogue in the industry.

1.6 The Cement Industry in India, as has already been pointed out, has tended to grow more in the Southern and Western regions of the country. This locational pattern has been a logical sequence to the availability of the basic raw material-limestone large reserves of which are concentrated in these regions. About 1.6 tonnes of limestone are required to produce one tonne of cement and hence in such a weight losing process, it is more economical to situate the factory at the source of supply of the raw material rather than to move the raw material to factories located near demand centres. But then, neither should the consumers in the deficit areas of the North and East be deprived of the availability of basic constructional material like cement by reason only of the regional imbalances in the production capacity brought about by raw material constraints and the consequent longer lead and higher transportation cost involved. This has been averted by the operation of freight pooling arrangement which has made cement available to the consumers at an equalised F.O.R. destination price all over the country. This arrangement should be continued.

1.7 During 1971 the short-fall was of the order of 1·5 million tonnes while it is estimated to increase to 2·5 million tonnes in 1972. In view of the disinclination of the existing units in the private sector to implement the remaining schemes without better incentives the gap is likely to increase to even 4 million tonnes in the next two or three years unless energetic steps are taken in the mean time to create additional capacity through expansion.

1.8 As regards estimates of production in Tamil Nadu, the present pattern of production being in excess of regional consumption, should continue as the surplus will be required by other deficit areas. There has, therefore, to be a conscious effort to create additional capacity by implementing the remaining schemes of the existing producers and establishing, if need be, new units. In view of the slow progress made in other regions and the non-availability of limestone deposits in the required volume, the Western and Southern regions will continue to be important producers with Tamil Nadu occupying a pre-eminent position.

1.9 Apart from the continuance of the freight pool-system what is equally important is the elimination of rail transport bottlenecks. There will of-course have to be proper price structure providing for automatic adjustment with escalation in cost due to factors

beyond the control of the industry. The unremunerativeness of fresh investment has been responsible for the slowing down of the pace of expansion and even the holding in abeyance new schemes.

2. *Ceramics.*

2.1 *White-Wares.*—During the last ten years the Industry has achieved rapid progress. By 1967 the index of production of pottery and earthernware rose to 149·7 tonnes taking 1960 as base year. Sanitary wares registered an increase from 6,144 metric tonnes in 1960 to 12,881 metric tonnes in 1969. Glazed tiles have shown an equally rapid increase from 3,768 metric tonnes in 1960 to 1,77,792 metric tonnes in 1969. During the same period the High Tension Insulators showed an increase of 453 per cent.

2.2 *Demand for White-Wares.*—There are only two factories in the Southern Region manufacturing crockery and dinner wares. There is increasing demand for these items in the country. There is no unit in this region manufacturing wall tiles the demand for which also is rapidly increasing. Large quantities of L.T. Insulators are required every year by the State Electricity Boards and the production from the two units in the South (other than limited production under taken occasionally by H.T. insulator factories) is not sufficient to meet the demand in this region. Good demand exists for various pressed procelain electrical items including 15 amps, 30 amps, 60 amps, 100 amps and 200 amps fuse units. There is also good demand for post and telegraph insulators. Various industries need different types of ceramic components and demand for such industrial ceramics is rapidly increasing. There is also a good market for chemical procelain as there is no unit in the South which makes these items on a large commercial basis.

2.3 *Setting up New Units for White-Wares—Ideal Conditions.*—With the availability of raw materials, skilled labour and with the increasing demand for the products in the Southern Region, especially within the State itself. Tamil Nadu offers ideal conditions for setting up new units for the manufacture of various types of white-wares. By orgainising a modern Functional Industrial Estate exclusively for Ceramic Industry and providing supply of processed raw materials including readymade body, glaze colours, etc., from a Common Facility Service Centre and with facilities of Modern Ceramic Testing and Research Laboratory, entrepreneurs will find Vridhachalam in Tamil Nadu as the ideal location for starting small scale units in ceramics.

3. *Crockery.*

3.1 *Units for the manufacture of White-Wares.*—Under 'White-ware Ceramics' it is proposed to include for consideration manufacture of crockery, L.T. Insulators, Glazed Wall Tiles and Sanitary-wares.

3.2 *Review of performance.*—It is seen that Industries manufacturing white-wares in our country considerably developed since 1969. The production of sanitary-wares increased remarkably from 2,750 tonnes in 1956 to 11,785 tonnes in 1968. While the production of glazed tiles in 1968 was 1,400 tonnes, that of dinner-wares in 1968 was almost four times of what it was in 1965.

3.3 *Production from* 1968 *to* 1970.—In 1968 twelve units for L.T. Insulators with an installed capacity of 10,632 produced 1,235 tonnes for a total value of Rs. 30 lakhs. In 1969, thirteen with 10,832 tonnes capacity produced 1,915 tonnes for a value of Rs. 45·9 lakhs. The production in 1970 was 2,100 tonnes valued at Rs. 50·40 lakhs.

3.4 Similarly 13 units for sanitary wares with an installed capacity of 15,970 tonnes produced 11,785 tonnes in 1968 to a value of Rs. 295 lakhs. The production increased to 12,678 tonnes (valued at Rs. 315 lakhs) in 1969. However, by 1970 the production was 12,450 tonnes only (Rs. 311 lakhs).

3.5 Four glazed tile units with installed capacity of 8,240 tonnes is reported to have produced 14,080 tonnes (Rs. 282 lakhs) in 1968, 17,635 (Rs. 352·70 lakhs) in 1969 and 20,400 (Rs. 408 lakhs) in 1970.

3.6 Nineteen units with an installed capacity of 21,010 tonnes produced 10,162 tonnes of crockery valued at Rs. 213 lakhs in 1968. In 1967, production was 10,634 tonnes valued at Rs. 212 lakhs and in 1970 it was 17,930 tonnes valued at Rs. 358 lakhs.

3.7 *Further Demand.*—There is a very good demand in the market for L.T. Insulators, wall tiles and crockery. In the case of sanitary wares existing capacity is reported to be adequate.

3.8 In L.T. Insulators, the annual demand by Electricty Boards of Tamil Nadu, Andhra, Kerala and for Mysore for pin type insulators, shackles and guy insulators is valued over Rs. 25 lakhs. Except the Ceramic Factory at Vridhachalam and the one at Gudur, there is no unit in the South regularly manufacturing L.T. Insulators. Total production in the two units is not even 50 per cent of the demand in these States. There are larger units manufacturing H.T. insulators and they do not take up production of L.T. insulators. Apart from the Electricity Board L.T. insulators are required in large numbers by post and Telegraphs Department. It is reported that since the last over two years considerable dislocation of work has occured in this department due to non-availability of Posts and Telegraphs Insulators. Immediate requirements of D.S. (Large D.S. Small) and P.H. Insulators by Posts and Telegraphs Department is over 50 lakh numbers. There is no unit in the South manufacturing insulators required by the Posts and Telegraphs Department. It is reported that in view of difficulties encountered in getting adequate quantities, the Government of India is thinking even in terms of importing them for the immediate use of the Posts and Telegraphs Department.

3.9 In the case of glazed wall tiles also the demand will exceed production in the country. In the whole country there are 4 units. There is none in the Southern State. Wall tiles, especially coloured tiles, are produced to match colour of sanitary wares. In Tamil Nadu there are three major units producing high quality sanitary wares but there is no unit to produce wall tiles to match. The demand for wall tiles is bound to increase further, especially, in view of large constructional activities contemplated during the next five years.

3.10 There is great demand in the country for higher quality crockery. More than 180 leading hostels and over 60 restaurants need over 900 tonnes of crockery to meet their intial demand. Crockery is manufactured by the Ceramic Factory at Vridhachalam and

by Messrs. Kerala Ceramics, Kundra, which is a commercial unit of the State Government of Kerala. Indian Airlines, Shipping Corporation, Railways and almost all big hotels in the country are complaining about the difficulty of getting adequate supplies of good quality crockery.

3.11 There is also good possibilities of exporting crockery, insulators, wall tiles and other white ware ceramics to countries like Malayasia, Singapore, Ceylon, Kuwait, etc. Export of Ceramic products has been steadily picking up.

3.12 *Raw materials.*—Main raw materials required in the manufacture of whiteware ceramics are (i) China Clay, (ii) Quartz, (iii) Felspar and (iv) Ball clay. For the manufacture of moulds gypsum is required in large quantities. All these raw materials are available in Tamil Nadu.

3.13 *Scope for the future.*—With the availability of raw materials, skilled labour and with the increasing demand for the products in the Southern Region, especially within the State itself, Tamil Nadu offers ideal condition for setting up new units for the manufacture of various types of " White-ware Ceramics ". In setting up ceramic factories large capita investment is required and they normally come under ' Medium ' or ' Large Scale ' category. By organising a modern Functional Industrial Estate exclusively for ceramic industry and by providing supply of processed raw materials, firing facilities, etc. from a common Facility Service Centre and with Services available from a modern ceramic testing and research laboratory, enterpreneurs will find Vridhachalam in South Arcot District an ideal location for starting units in Ceramics.

4. *Ceramics.*

4.1 *Low-tension insulators.*—The demand for low tension insulators is increasing due to rapid increase of electrification and the requirements of different types of insulators in various industrial machines, instruments and equipment. The setting up of the Functional Industrial Estate at Vridhachalam has created a very good opportunity for small scale units to be started there with minimum capital investment. At present, there are about 15 small scale units and 3 large scale units, manufacturing low tension insulators. However, there is scope for putting up a few more units for the manufacture of low tension insulators. The requirements of the Tamil Nadu Eelctricity Board alone exceed Rs. 30 lakhs per annum and a large part of these requirements are met from outside the State. There is scope for five more units.

4.2 *Crockery.*—There is good demand for cheap crockery as also for very high quality decorated crockery. Both items could be manufactured more economically in the small-scale sector. Vridhachalam is well suited for this purpose because of the Functional Industrial Estate and the facilities available for obtaining processed raw materials, technical-assistance and common service facilities. There are no organised units in the State manufacturing crockery. There is scope for setting up at least two units in this line.

4.3 *Art Pottery.*—The manufacture of art pottery wares like ash trays and advertisement novelties offers good scope for development. Since artistic skill and novelty of design are the most important requirements for these types of units, the output depends on the availability of skill, especially artistic skill. Similarly, the decoration of plain crockery with coloured glaze, over-glaze hand painting, transfer printing silk and screen printing offers an excellent scope for development.

4.4 Capital investment will be comparatively low, say, Rs. 10,000 per unit. There is scope for setting up at least 5 units at Vridhachalam.

4.5 *Refractories.*—The demand for refractories is increasing at a very fast rate and there is a serious shortage of refractories in the South. With increasing industrialisation and the commissioning of the steel plant at Salem, there will be a large increase in demand. While the high quality refractories can be manufactured only by a large scale unit, there is demand for a wide variety of refractory specials and special types of refractories. It may be mentioned that quality fire clay is available at Neyveli as a by-product. However, this is not being utilised at present. A good small scale unit can be set up with a capital investment of Rs. 10 lakhs and there is scope for setting up atleast two or three units in this line, preferably at Vridhachalam or Neyveli.

6. *Technical Ceramics.*—While the demand for traditional items of ceramics like common crockery art ware, tiles and sanitary ware will continue to grow, an entirely new field has opened up for technical ceramics following the development of a series of ceramic items required in other industries like metallurgical, engineering, chemical and electronic industries. The demand from the electronic industry itself is so large that quite a few small and medium scale units will have to be set up to meet the requirements. Fertilities, resistances, capacitors, condensers, etc., are required in very large quantities and a very rapid expansion is anticipated in the future. Similarly, di-electric materials like barium titanates, magnesium titanates, sinconates would also be required in electronics. In the field of chemical industries, special types of chemical stone-ware, raschig rinks, acid-proof bricks and tiles and chemical laboratory ware are required in large quantities. While scope also exists in the field of new abrasive materials l ke carbides, nitrades, and borides, new sintered ceramic cutting tools, offer good scope for development.

7. *Salt Glazed Stoneware Pipes.*

7.1 Salt Glazed Stoneware Pipes are the ideal for the disposal of sewage. With the increase in the constructional activity in the State, the demand for these pipes has been steadily increasing. The Tamil Nadu State Housing Board has taken construction of new colonies and housing projects. The State Government have constituted a separate Board for the construction of houses for slum dwellers. A separate autonomous body called Tamil Nadu Water Supply and Drainage Board has been constituted to accelerate water supply and drainage schemes in the State. These have resulted in creating a large demand for stoneware pipes. There is also plenty of scope for selling these pipes in Kerala, Andhra Pradesh and Mysore.

7.2 The Water Supply and Drainage Board has estimated its requirements in stoneware pipes at about 10,046 tonnes per annum as detailed under :

Serial number.	*Size.*	*Requirements in tonnes.*		
		1971–72.	1972–73.	1973–74
1	100 mm. dia S.W. Pipes	3,238	3,238	3,238
2	150 mm. dia S.W. Pipes	808	808	808
3	200 mm. dia S.W. Pipes	650	650	650
4	250 mm. dia S.W. Pipes	650	650	650
5	300 mm. dia S.W. Pipes	1,000	1,000	1,000
6	450 mm. dia. S.W. Pipes	3,700	3,700	3,700
		10,046	10,046	10,046

7.3 Over and above this, the total requirements of Housing Board, Slum Clearance Board and Madras Corporation and retail demand for individual house construction is likely to exceed 17,000 tonnes per annum.

7.4 Thus, the immediate requirements of stoneware pipes in Tamil Nadu can be estimated at about 30,000 tonnes per annum for the next many years to come.

7.5 There are only three factories in Tamil Nadu manufacturing stoneware pipes. Their total capacity is about 22,000 tonnes per annum. It can therefore be seen that with the present demand for stoneware pipes in the market, there is a clear case for setting up more units in Tamil Nadu for the manufacture of salt Glazed Stoneware pipes.

7.6 Out of the three units only one is capable of making pipes up to 375 mm. However, for major drainage works the requirements will be more in larger diameter pipes, i·e , 300 mm., 450 mm., 600 mm., etc. Pipes in these diameter have at present to be obtained from North India at high prices and incurring heavy transport charges. Such purchases also result in substantial loss to the Consuming departments due to heavy rejections in transit. It is, therefore, advisable to put up plants capable of producing larger diameter pipes.

8. *Glass Products.*

8.1 The nucleus of a glass industry has to be developed in Tamil Nadu because of the growing demand for bottles of different types, sheet glass and fibre glass. A large sized unit may be established for manufacturing bottles and sheet glass at a cost of Rs. 5 crores for meeting the demand not only in Tamil Nadu but in the adjoining areas. The required sources of raw materials will have to be explored and established. A good beginning has to be made as in the coming years there will be a growing demand for different types of glass products and this industry has to be developed on a regional basis in order to avoid unnecessary breakage through transport over long distances.

8.2 Vaccum flasks are required in large numbers being an essential consumer item. There was one unit in Tamil Nadu but this remains closed for a long time. There is scope for setting up one more unit.

8.3 It may be necessary also to produce glass shells and tubes for meeting the needs of a large unit for manufacturing electric lamps. An outlay of Rs. 3 crores will be needed for this purpose.

9. *Refractory Industry in the State.*

9.1 At present there are four large magnesite industries producing about 100,000 tonnes of dead burnt magnesite and basic refractories and four large/medium/small-scale units accounting for production of about 30,000 tonnes of fire bricks of various heat ranges such as moderate heat duty, High heat duty, super heat duty (high aluminia), insulating, sillimanite and kynaite qualities. A survey during 1968 has indicated the following All-India and Tamil Nadu capacities for the various types of refractories.

Installed Capacity ('000' tonnes).

	All-India.	*Tamil Nadu.*
Fire bricks	943	
Silica	98	
Basic	118	30*
High Alumina	20	
Insulating	16	
Fire Cements and Mortar	63	78 (estimated capacity of 3 units only).
	1,258	
Dead Burnt Magnesite	98	
	1,356	

* Of this 18,000 may be taken as for fire bricks. This gives an idea of the position of the Refractory Industry in Tamil Nadu in an All-India perspective.

9.2 It will be interesting to note that nearly 75 per cent of the fire bricks is consumed within the State and the balance is being sent to other States. At the same time quite a large quantity of fire bricks including basic and sillica bricks required for the factories in South India are procured from factories located in North India to the extent of about 15,000 to 20,000 tonnes annually. Hence, there is a good case for generating more capacity for refractory in Tamil Nadu itself.

10. *Prospects of the State refractory industry during the next ten years.*

10.1 With the setting up of the continuous steel casting plant at Arkonam by the Tamil Nadu Industrial Development Corporation, the refractory industry in the State is entering a New Era during which, the prospect of getting a steel plant within the State and two more in neighbouring States, it has also to play an important role in catering to the needs of the steel industry. All along, except for the four plants at Salem which were the only ones producing basic refractory and dead burnt magnesite, all the other refractory units, big or small, have been producing fire bricks for industries other than steel such as cement, sugar, etc., mainly by the stiff plastic process.

10.2 But the demands of steel plants and modern steel casting plants as the one at Aarkonam call for refractories fire bricks as well as other type of bricks to conform to very stringent specification and quality of a high order which the existing industries could gear up to manufacture. The requirement of Aarkonam Steel Plant annually is approximately as follows :—

3,000 tonnes of fire bricks.

3,000 tonnes of basic bricks.

5,000 tonnes of ramming mass.

10.3 As far as the fire bricks required for this plant are concerned, they are of the high grog and high alumina type. Till now, this type of fire bricks was not fully developed here. But in the course of a couple of years the large scale refractory units in the State will be in a position to meet the needs of the plant. There is prospect of some small-scale units coming up rapidly which will manufacture common types of fire bricks and these will enable the large units to have enough capacity for high grog and high alumina bricks. In the meanwhile, the surplus in the All-India capacity for high alumina and high grog bricks cannot be considered as it will involve transport problems and high cost. It will be unwise to depend on the surplus capacity available outside the State. There is a good case for a new unit.

10.4 The basic and silica bricks requirements being not a large quantity, should be met by the existing industries in and outside the State. One plant has already been started in Salem for the manufacture of chemically bonded bricks with a capacity of about 3,000 tonnes/annum at present and it is likely to expand further.

10.5 While considering the projection of the refractory industry during the next ten years it will be convenient to do so in two distinct categories (1) Refractories for the steel plants, these accounting for nearly 65 per cent of the consumption of refractories in the country and also demand special quality bricks in all types, fire clay, basic and silica and (2) Refractories for industries other than steel projects like cement, sugar, engineering industries ceramics and foundaries where only fire clay bricks are used.

10.6 The requirement of the steel plant at Salem and continuous steel plant at Arkonam will be considerably large in the coming years. Eventhough this can be met partly from the additional capacities proposed at Bhilai, Bokaro and Orissa, it will not be possible for the Salem and Arakonam Plants to depend for refractories on units in other States. Moreover, we have the best magnesite for basic refractories and also good fire clay in Tamil Nadu. As far as possible the requirement of Salem and Arkonam plants should be met from the units within Tamil Nadu.

10.7 With regard to basic refractories, import of burnt bricks up to 1974 would appear inescapable. The actual quantities imported should of course take into account the steel making capacity reached at the plants, the dead burning capacity available and the inventories in the plants. Beyond 1975, however, the capacity in the country will be more than enough to meet the demand.

10.8 The immediate deficit in the silica bricks (both in coke ovens and other types) would require to be met by imports. Thereafter, the fluctuating deficit and surplus can be managed by the public sector plants at Bhilai increasing their capacity for silica bricks from 10,000 to 20,000 tonnes and also by planning to advance the requirements when surplus is available.

10.9 The demand of non-steel industries like cement, sugar, engineering, chemical, and ceramics, both large and small scale and of Ferrous and non-ferrous boundaries will be mainly fire bricks i.e fire clay bricks of moderate, high and super heat duties with alumina content ranging from 30 to 70 per cent and other types of fire bricks like sillimanite, kyanite and acid resistant bricks.

10.10 Taking that the present tempo of industrial growth in the State will continue during the next ten years the simple growth rate is about 8 per cent over the base year 1960 the general industrial output will be more by about 50 per cent over the present. Hence, the demand for refractory also will go up correspondingly. Taking into account the constructional demands and even the requirements of Arknonam Steel Plant (about 3,000 tonnes firebricks), the demand by about 1982 may be taken as double the present one i.e. will be about 30,000 tonnes annually within the State for fireclay bricks. This requirement can be met by expanding the capacity of the existing units as well as by establishing new units.

11. *Recommendations :* The task force recommends :

Cement :

11.1.1 Further expansion of cement production in Tamil Nadu will be feasible only if the continuance of the present system of freight pooling is ensured at least for the whole of the Fifth Five-Year Plan period so that the large availability of raw material resources is exploited and sufficient production is ensured to meet the demands of the deficit pockets in the country particularly those in the Northern and Eastern regions.

11·1 2 The perennial shortfall in the allotment of wagons for outward movement of cement or for inward movement of vital raw materials such as coal is a serious problem. So long as this is not solved, it is likely to erode into the profitability or economic viability of the industry. This can be solved by resorting to the following measures :—

(i) double tracking the entire railway line between Madras and Calcutta.

(ii) by laying separate railway lines direct from Madras to the coal producing regions.

(iii) by making available more wagons for facilitäting the movement of raw materials and finished products.

(iv) by laying an inland waterway connecting the south Indian rivers as it would facilitate the movement of heavy and bulky raw materials.

11.1.3 Provision of liberal financial assistance to the Industry through various Governmental and quasi-Governmental institutions in such a way as to enable the existing plants to increase their capacity.

11·1.4 Setting up of a Commission to enquire into the cost structure of the industry so that a fair price for cement which would be advantageous to the industry as well as to the consuming public may be fixed for a period of time.

11·1.5 Setting up three more units of 4 lakh tonnes capacity in the Fifth and Sixth Plan periods.

11·2. *Glass Products* :—The following recommendations are made :

11 2.1. The demand for glass bottles will be considerable for some more time to come and this is especially so in view of the lifting of prohibition as well as in the context of the establishment of new breweries and units for the manufacture of potable alcohol. Though there are prospects for one unit being established at Serthalai in Kerala and another at Hyderabad in Andhra Pradesh, Tamil Nadu could still go in for one unit for the manufacture of bottles.

11.2.2 The All-India demand for glass shells at the end of the Fourth Plan period will be of the order of 250 millions and hence one unit may be established in Tamil Nadu for the manufacture of glass shells required by the lamp making industry.

11.2.3 The domestic as well as the foreign demand for vacuum flask will treble in the course of the next 10 years. Besides, this item has a very high export potentiality. This industry requires a special incentive and this can be given by removing the 15 per cent advalorem excise imposed on it. One unit for the manufacture of vacuum flask in the Salem or Dharmapuri district may be established.

11.2.4 The glass fibre industry is growing at an explosive rate with the adoption of new application and uses. It may be necessary to think of developing one unit for this in the Sixth Plan period.

11.2 5 There is already one unit for the manufacture of sheet glass. The production of sheet glass has increased from 0·95 million square metres to 41·4 million square metres in 1970.Since the principal raw materials for the manufacture of sheet glass are silica, soda ash, felspar and limestone it will not be difficult to locate one more unit for this in Tamil Nadu.

11.3. *White ware ceramics and salt glazed stoneware* :

11·3·1 Tamil Nadu offers ideal condition for setting up of new units for the manufacture of various types of white ware ceramics. The modern Functional Industrial Estate, set up exclusively for ceramic industry, through the provision of adequate supply of raw materials, firing facilities and common facility service centre with services available for a modern ceramic testing and research laboratory at Virudhachalam will be of great help. New entrepreneurs in the medium and large scale sector can be attracted for setting up plants in South Arcot district.

11.3·2 It is recommended that two more plants for the manufacture of stone-ware pipes of large diametre, i.e. 300 mm. 450 mm. and 600 mm. may be set up; one at Chingleput and another at Tiruchirappalli.

11.4. *Refractories* :

11.4·1 With the coming up of the Neyveli Lignite Corporation, Bharat Heavy Electricals, the Ennore Thermal Unit, various fertilizer units and also the expansion of the existing cement plants and the commissioning of the Concast Plant at Arkonam, it will be necessary to expand the activities of the existing refractory units in the State. There is prospect for setting up one plant in Salem district and another in Ramanathapuram district.

11·4·2. *Mechanised Bricks* : Three units in the large scale sector for the manufacture of mechanised bricks may be set up either in the joint sector or Private Sector. These may be located at Tiruchirappalli, Chingleput and Salem.

TABLE I.

EXPORT OF CERAMIC AND ALLIED PRODUCTS, ASBESTOS/CEMENT PRODUCTS, EMERY GRAIN POWDERS, PASTE AND EARTHERN-WARE AND TILES FROM INDIA.

(Rs. 1,000.)

Country.	62–63.	63–64.	64–65.	65–66.	66–67.	67–68.	68–69.
Australia	5·4	0·6	0·2	..	..	2·4	..
Aden	8.8	7·4	19·7	..	..	..	17·7
Afganisthan	11·5	5·2	4·9	..	..	..	..
Bahrein	0·6	1·1	0·8	0·2	0·2	..	11·2
Congo	..	30·2	..	..	..	1·1	..
Ceylon	18·4	27·1	29·5	4·3	9·6	7·3	·7
Fiji	..	9·8	..	..	..	..	..
Germany West	..	10·7	2·2	1·9	..	3·7	..
Indonesia	1·1	5·7	..	..	..	..	0·5
France	6·8	..	..	..	..	..	..
Kenya	5·8	12·4	3·3	..	3·3	48·5	17·3
Kuwait	1·1	0·6	0·6	1·7	0·2	..	..
Mauritus	0·5	0·8	1·4	..	..	0·9	..
Mozambique	..	..	15·4	4·7	..	0·6	..
Nepal	0·3	3·6	0·9	..	39·6	2·1	114 0
Quatar and Oman	..	0·6	1.4	0·5	..	..	7·4
Pakistan East	30·7	1·7	6·9	3·0	..	..	..
Pakistan West	4·6	22·5	5·5	3·9	..	..	..
Saudi Arabia	2·7	..	2·2	1·7	..	0·5	..
Thailand	2·4	2·7	..	3·5	..	1·2	..
U.K.	1·7	7·1	8·8	5·8	3·4	8·0	..
U.A.R.	2·2	4·4	0·8	..	..	2·5	..
U.S.A.	18·6	3·0	3·8	10·7	3·4	8·9	2·1
Kalaur	2·0	0·3	0·6	1·6	13·2	79·9	168·7
Libya	..	..	..	..	3·6	..	..
Nigeria	..	1·1	..	0·3	5·7	14·3	..
Others	42·4	39·7	14·4	11·5	7·5	27·1	27·6
Total ..	167·6	189·3	123·3	55·3	90·7	205·9	377·7
	($22·2)	($25·2)	($16·4)	($7·4)	($12·1)	($17·4)	($50·4)

Source : Federation of Indian Export Organisations.

TABLE II.

Export of Procelain Insulators.

Country.	62–63.	63–64.	64–65.	65–66.	66–67.	67–68.	68–69.
Ceylon	5·8	17·0	3·9	29·1	..	9·7	288·9
Iran	..	..	..	..	..		50·6
Iraq	..	..	..	..	..	..	783·4
Malasia	..	..	..	9·0	..	..	69·3
Burma	2·5	..	..	..	..	..	100·3
Kuwait	..	..	..	..	5·9	27·3	24·2
Sudan	..	..	..	..	..	..	19·1
Kenya	..	..	..	1·6	..	..	2·6
Mauritus	..	..	..	..	..	..	1·1
Muscat	..	..	..	..	..	..	0·9
Singapore	..	..	..	..	8·7	0·7	1·5
Japan	..	..	..	..	1·6	..	..
Germany West	0·2	..	..	..	13·9	..	..
Pakistan East	36·5	11·0	23·6	32·4	..	..	..
Libya	..	..	..	6·5	..	..	..
Nepal	0·5	..	..	2·2	..	..	..
Vietnam South	..	..	15·3	..	..	..	..
Cotar and Omen	2·4	..	..	..	..	..	17·9
Total ..	47·9 (\$6·4)	28·0 (\$3·7)	42·8 (\$5·7)	80·8 (\$10·8)	30·1 (\$4·0)	37·7 (\$5·0)	1,359·8 (\$181·3)

Table III.

Capacity Utilisation in Refractory Industry.

(Lakh tonnes)

Year.	*Capacity installed.*	*Actual Production.*	*Percentage utilisation Capacity.*
1950–55	2·90	2·37	82
1955–56	4·44	2·80	63
1960–61	8·18	5·67	69
1965–66	12·40	6·95	56
1966–67*	12·74	7·30	57
1967–68*	13·36	7·49	55
1968–69	13·00	6·29	48
1969–70	13·00	6·49	50
1970–71 (Estimated) ..	11·37	7·45	65

* Calender Year.

TABLE IV.

INDUSTRIES HAVING SCOPE FOR DEVELOPMENT IN SMALL SCALE SECTOR IN TAMIL NADU.

Product.	Capacity/ day.	Capital Investment.		Number of Units.	Employment in each Unit.	Location.	Remarks.
		Fixed. (Rs.)	Working. (Rs.)				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Glass—							
1 Glass Containers	10 tons.	10 lakhs.	5 lakhs.	5	300	Madras, Madurai, Tiruchirappalli and Coimbatore.	..
2 Pressed Glassware	4 tons.	7 lakhs.	3 lakhs.	2	100	Madras.	..
3 Cut-Glass-ware ..	1 ton.	3 lakhs.	2 lakhs.	..	..	Madurai.	..
4 Glass tubes ..	3 tons ..	10 lakhs.	5 lakhs.	2	75	Madras.	..
5 Scientific Glass Apparatus.	..	2 lakhs.	1 lakh.	10	20	Madras, Coimbatore, Tiruchirappalli and Madurai.	..
6 Miniature lamps	3,000 Nos.	75,000	50,000	10	50	Madras, Madurai and Coimbatore.	..
7 Safety Glass ..	3,000 sq. ft.	5 lakhs.	3 lakhs.	1	100	Madras.	..
8 Fibre Glass reinforced plastics.	25,000	25,000	1 lakh.	10	20	All district towns.	..
9 Vacuum Flask ..	1,000	10 lakhs.	5 lakhs.	2	150	Madras, Coimbatore and Salem.	..
10 Optical lenses ..	..	1 lakh.	1 lakh.	10	10	Madras and Coimbatore.	..
11 Opthalmic lenses	..	50,000	50,000	10	10	All district headquarters.	..
Ceramics—							
12 Low Tension insulators.	½ tonne.	50,000	50,000	5	10	Vridhachalam.	..
13 Crockery ..	½ tonne	2 lakhs.	1 lakh.	2	150	Vridhachalam.	..
14 Art Pottery ..	..	10,000	15,000	5	5	Vridhachalam.	
15 Refractories ..	20 tonnes	10 lakhs.	6 lakhs.	2	100	Vridhachalam, Neyveli.	..
16 Technical ceramics	..	1 lakh.	50,000	4	20	Vridhachalam.	..
17 Building bricks	18,000	1 lakh.	1 lakh.	30	50	Near all big towns.	
18 Roofing tiles ..	8,000	7 lakh.	1 lakh.	5	100	Ramanathapuram, Tirunelveli, Thanjavur and Madras.	..
19 Mosaic Tiles ..	7 squares.	1 lakh.	1 lakh.	10	30	All important towns.	..
20 Cement products	135 cft.	1 lakh.	1 lakh.	10	40	Near all big towns.	..

CHAPTER IX.

Electrical Industries.

1. *Introduction.*

1·1. The installed capacity for generation of electricity is a measure of industrial advancement of a country. While the growth of the electrical equipment industry is directly proportional to the additions in installed generating capacity, the development of the industry, in general, is also dependent on easy availability of adequate electric power.

2. *General Equipments.*

2·1· This covers equipments required for generating stations including both Hydro and Thermal like Turbines. Alternators, Auxiliaries, Boilers and penstocks. The first manufacturig unit for these equipments was set up by the Government of India in 1954 in Bhopal and subsequently in 1960, two more heavy plants, one at Haridwar and the other at Hyderabad for manufacture of Hydro and Thermal power station equipments and a high pressure boiler manufacutring unit at Trichy, were set up. In the original programme of manufacutre, the Bhopal plant was designed to take up only Hydro turbines and generators in the field of generating plants. But later a scheme to manufacture steam turbines and turbo generators was also approved for manufacture. The plants in Haridwar, Trichy, Hyderabad and Bhopal match with each other for meeting the demand for the various Hydro and Thermal Stations in the country and also the Madras Atomic Power Project in Kalpakkam. The Hyderabad plant manufactures steam turbines, turbo alternators and certain power station auxiliaries like pumps while the Trichy Plant manufactures the entire range of requirement of boilers and other accessories for not only power stations but also for various chemical and petro chemical industries. These units have made a name for themselves and it is heartening to note that the Trichy Unit has also entered into the export market now. It has also programmes for diversification in collaboration with a U.S. concern. Although there is no possibility for any further plant of this type in the State, except a significant expansion of the existing unit for diversification, immense possiblities exist for a larger number of anciliaries, particularly, in the small scale sector to meet the requirements of intermediate assemblies, components, like castings, forgings, etc., required for the high pressure boiler plant at Trichy. In this regard, the State Government are in close touch with the authorities of Bharat Heavy Electricals Limited and are envisaging expansion of the existing ancillary industrial Estate at Thiruverambur set up by the State Government.

3. *Transformers.*

3·1. The transformer industry in India is well developed and most of the requirements are being met indigenously. In Tamil Nadu, there are three units with a total capacity of 7,14,000 KVA and one of them has even entered the export market in a very substantial way. This industry has given rise to a large number of ancillary units in the Small Scale Sector for the suply of important components and sub-assemblies like winding stripes, conductors and on load-tap changing units.

3·2. Instrument transformers of the lower rating and for low tension use have got scope and could be encouraged in a large measure in the Small Scale Sector by channelising all possible assistance. Other fields of this industry that can develop are Rectifier transformers, Regulator transformers, Low voltage air cooled transformers and Control transformers.

4. *Electric Motors.*

4.1 The motor industry in India is well organised and most of the requirements are met indigenously though special types of motors may still have to be imported. There are over 100 units in Tamil Nadu engaged in the manufacture of motors and most of them are concentrated in and around Coimbatore. Most of these units are specialising in capacities ranging from 0·5 H.P. to 25 H.P. and very little is done in respect of fractional and sub-fractional H.P. motors required for appliances and other allied uses. Tamil Nadu does not have units manufacturing motors above 200 H.P. and demand exists for this also.

4·2 The main problem in the manufacture of motors is the non-availability of the standard type of stampings and this can be evercome if at least two or three units for the manufacture of electrical grade stampings are set up. Three units have been licensed for this purpose and one of them will be making stampings for their own transformer industry. The other two will meet mostly the requirements of motor laminations required in Coimbatore. The SIDCO can assist in stocking some of the important sizes of stamping for distribution to Small Scale Motor Units.

4·3 The manufacture of D.C. motors has not yet been taken up in a substantial way in this State. There is scope for the manufacture of not only small sized D.C. motors for special purposes but also for manufacturing ancillary assemblies like commutators and brush housing, required for larger manufacturers. Special types of motors like flame proof motors and geared motors have good scope and Tamil Nadu has still to make a proper beginning in this regard.

5. *Switch-gear and motor control gear.*

5·1 The manufacture of extra high tension voltage switch-gear like the air blast circuit breakers and oil circuit breakers are concentrated in Bhopal, Hyderabad and Bangalore in the hands of the large public sector and private sector undertakings. There is no scope for such type of units in this State since the country's demand are well taken care of by these units. But the manufacture of E.H.T. and H.T. Isolators are within the Small Scale Sector and could be encouraged.

5·2 Motor Control Gears like direct on-line starters and starters are now available indigenously and one unit for the manufacture of air break conductors of higher ratings required by large-scale indistries such as iron and steel, fertilizers and chemicals could be encouraged.

5·3 Low tension circuit breakers are now made by two concerns in the State and both of them have adopted U.K. design. One of these units is doing very well and the other had a lot of management problem with the result production was not continuous.

6. *Cables and wires.*

6·1 The Cables and Wire Industy in India is so developed that most of the requirements for power and industrial cables are being met indigenously. However, some special types like communication and power cables of extra high tension are still to be imported.

6·2 The A.A.C. and A.C.S.R. conductors required for overhead transmission and distribution lines are met indigenously and exports have also been started. Although the present capacity is adequate to meet the internal demand as well as export demand, the units, particularly those in the small scale sector, are all faced with irregular supply of E.C. Grade Aluminium which has resulted in an indefinite production.

6·3 Flexible cables, mining and drilling cables are now well developed as also the railway signalling cables. Aluminium is being freely used in P.V.C. and V.I.R. cables for L.T. and also H.T. usage. The existing capacity in regard to winding wires and strips can meet the estimated demand up to 49 swg., and it is still necessary to import wires finer than 44 swg. Special insulated wires like glass fibre covered wires, H.P. cables and radar cables are also now made in the country and there is no scope for further units for some more time to come.

7. *Capacitors and condensors.*

7·1 The Capacitor Industry in India is developing at a fast rate and will be in a position, to meet most of the requirements indigenously, but some special capacitors may still have to be imported. The large size power factor capacitors both rotary or synchronous and static capacitors are now made by Heavy Electricals, Bhopal who also manufacture cable capacitors and capacitative voltage transformers.

7·2 The starting and suppression vapour condensor (1 to 40 microfarads) required for electric fans, flourescent tubes, mercury vapour lamps and small motors have scope particularly in the Small Scale Sector. The main raw materials required for the manufacture of capacitors like aluminium foils, tissue paper and improgating media have to be imported for some more time to come since the indigenous capacity is slowly being built up. For another five years, the import for these items has to be permitted in a liberal manner.

8. *Insulating materials.*

8·1. The Ceramic Insulating materials like insulators and bushings are manufactured in sufficient quantities in Tamil Nadu by two large sized units who are now engaged in the manufacture of high voltage and extra high voltage insulators including transmission stocks, post type insulators also. Both these units have up-to-date testing facilities. The Government Unit at Vridhachalam is manufacturing L.T. Insulators and have a plan for expansion. As regards the other insulating materials like tapes, varnish cloth, cotton and empire tapes, wood craft paper, crape paper, etc., no headway has been made. Scope exists for the tapes in the small Scale Sector. Also, there is scope for paper based insulating materials like leatheroid paper, press paper, manila paper, crape paper, kraft paper and one unit exclusively for manufacturing these insulating materials could be set up either independently or as part of expansion in one of the existing paper units. Mica based

insulating materials like glass and mica tapes, paper tapes, mica strips and micanite also offer good scope. There is no unit in Tamil Nadu making these. The Heavy Electricals Limited, Bhopal, should be able to furnish technical know-how for these from their R & D. Organisation.

8·2. The cable paper is now entirely imported at present and scope for indigenous production should be investigated specially along with the process for the manufacture of manila paper, crape paper, kraft paper, capacitor, tissue paper and all other electrical grade papers. The State Government could send a team to the Institute of Paper Technology, Saharanpur and the Forest Research Institute, Dehra Dun, for discussions in this regard to evolve a scheme for setting up a plant for Electrical Grade Papers.

9. *Railway electrification.*

9·1. The Railway Electrification Organisation have been attaching highest importance to reduce the foreign exchange requirements to the very minimum and have developed quite a number of indigenous materials like transmission lines, sub-stations, switching stations, remote control equipments, overhead equipments, signalling and telecommunication equipments and rolling stocks.

9·2. Although most of the above items are in the purview of the larger units particularly in the public sector, the industries in the private sector especially those in the Small Scale Sector can play a notable part by supplying the ancillary components and assemblies. The medium size galvanising unit in Mettur set up by the Tamil Nadu Small Industries Corporation can meet the needs of the transmission line towers to a great extent and it can be extended to take in 12 metre masts. The railway electrification programmes will be able to encourage a large number of ancillary industries both in the medium and small scale sector and in this regard, the Small Industries Service Institute and the Director of Industries and Commerce have to keep a close liaison. The sub-contract exchange of the S.I.S.I. requires to be fully geared up to give full information and details and all the ancillaries and sub-ancillaries required by the railways.

10. *Batteries.*

10·1. The lead-acid battery industry has made a marked improvement and has been meeting the demand in the country. Constant research and development work in this regard has put this industry on a very sound footing. Batteries for not only the automobile industry but also for traction, electric cars, small trucks, fork lifts, and other purposes have now come into vogue. Technological improvements have been effected in battery containers, pastes and also in the techniques like dry batteries and dry charged batteries. In addition to the lead-acid and nickel iron batteries, sodium sulphur, lithium chlorine and zinc-air batteries are also coming into vogue. These have a good scope for further developments. As far as Tamil Nadu is concerned, there are two units, one in the Small Scale Sector and the other in the Medium Scale Sector making lead-acid batteries, besides one unit in the Large Scale Sector producing dry batteries. Scope exists for setting up two units, one for the manufacture of sophisticated sturdy batteries for power vehicles, lifts, railways and tracks and the other for producing dry batteries required for electronic

industries, instruments and miniature lamps. The Central Electro-Chemical Research Institute, Karaikudi has developed certain processes which would be available for the industry.

11. *Electrical appliances.*

11·1 The most important electrical appliance is the fan, and India with a production of 1·5 million fans per year is the third largest manufacturer of the fans in the world and Tamil Nadu does not have a substantial share in this industry. There are four units in Tamil Nadu manufacturing fans and one of them is making only railway fans. The capacities of these units range from 500 to 1,000 per month. Scope exists for the manufacture of fans, ceiling fans, table fans, pedestal fans, air circulators, industrial fans, exhaust fans and blowers. The main raw materials required for this industry are steel stampings and winding wires and due to the non-availability of these critical items, this industry has not been able to make the required headway. Among the other appliances may be mentioned electric irons, heaters, cooking ranges, toasters, laboratory heaters, soldering irons, kettles, percoalators washing machines, industrial appliances like mixers, shakers, etc. The motors required for these appliances have to come from Delhi or Bombay. Industries for making fractional and sub-fractional H.P. motors have scope.

12. *Lamps.*

12·1 The Lamp Industry in Tamil Nadu has not developed although two or three units were set up. One of them has now been closed and only one unit in Madurai is now manufacturing flourescent tubes. Even this unit is facing difficulties in regard to the supply of raw materials like chemicals, lead-in-wire, etc. In addition to the demand for a good unit for making G.T.S. and mercury vapour lamps, scope exists for two or three units for making the ancillary items like little lead-in-wires chemicals, etc. There is scope for one large sized unit for manufacturing lamps of different types.

13. *Meters, instruments and relays.*

13·1 Tamil Nadu has two major factories manufacturing meters and both of them are working to capacity and can diversify their capacities. Electrical measuring instruments like moving iron and moving coil instruments, portable multi-meters, insulation testers, earth testers, cell testers, clip-on ammeters, thermo couples, watt meters, thermo stats and resistance boxes offer ideal scope for indigenous development. One major unit in Tamil Nadu is manufacturing relays required for power systems.

14. *Transmission and distribution.*

14·1 The total fabrication capacity for transmisison line towers in the country is estimated to be about 1·2 lakhs metric tonnes while the installed capacity in the erection sector is around 93,000 metric tonnes. The manufacture and erection of transmission line towers form the basis of power transmission. In Tamil Nadu two structural shops in the State-owned Tamil Nadu Industries Corporation are manufacturing towers of very high quality and have also taken part in the export field in a satisfactory manner. These shops could be expanded to diversify and balance their capacity.

15. *Basic problems of the Electrical Industry.*

15.1. *The Procurement policy of State Electricity Boards.*—The industry has been facing a very serious problem in regard to flow of orders for electricial equipment such as transformers, cables, wires, switchgear, etc., from the main consumers like the State Electricity Boards. The orders do not flow evenly. Sometimes the Boards place orders for their requirements of two to three years and thus build up their inventories with the result that for the next two or three years, there are practically no orders. The cumulative effect of such an approach is very disastrous as additional investment is required to gear up the manufacturing units to meet the short-term demands whereas the plant has to remain idle during the periods when there are scarce or no orders at all. It is desirable that there should be a co-ordinated effort to see that orders are phased out uniformly on the base of annual requirements to ensure economical production and optimum utilisation of the plant and equipment. There can be better planning of purchases by the State Electricity Boards in the next two plan periods as they will be called upon to shoulder heavy responsibilities and the new targets for generating capacity will be reflected in an unprecedented demand for different products.

15.2 *Foreign collaboration.*—Foreign collaboration and investment is a necessity in the present state of our development particularly in sophisticated fields ; and this need would continue to exist for many years to come. Although during the last few years indigenous know-how has developed in many fields, much remains to be done. There is a great saving of time, energy and expense in buying the know-how rather than in attempting to rediscover what has already been discovered. Even technically developed countries buy know-how from each other, because on the whole, it is cheaper. Technology is progressing fast and it is not advisable to duplicate efforts.

15.3 *Policy in regard to licensing.*—The liberalisation of licensing policy and partial removal of controls in the industrial field would definitely encourage more competition between the producers and create more cost consciousness as well as result in considerable benefits to the consumers. In order that such a policy is made effective a free and fair competition between the private and the public sector undertakings must also be ensured.

15.4 *Import policy.*—Wherever possible, indigenous capacity should be created and technical know-how developed to reduce the import of raw materials, components and finished products. Representations have already been made to Government by the Indian Electrical Manufacturers' Association to stop imports of cables and wires, power and distribution transformers, switchgear, capacitors, etc., for which adequate capacity exists in the country.

There should be an intelligence cell in the D.G.T.D. and also in the State Directorate of Industries which should maintain proper statistics and keep a track of all licenses issued, production commenced—quality and quantum of production and the requirement of the particular items in the country. What appears to happen now is that as soon as manufacturing capacity is allowed for an item, the import is stopped. This calls for a separate branch in the State Directorate of Industries headed by a Technical Officer in the rank of at least a Joint Director to deal with all aspects of Electrical and Eleactronic Industries.

16. *Itemwise Notes.*

16.1 ***Transmission and distribution—***

16.1.1 As per the policy of the State Electricity Board, electrification of 2,000 villages a year and 50,000 pumpsets a year has to be taken up and enlarge the transmission and distribution system to facilitate the above.

16·1.2 According to this, the projected plan for H.T. and L.T. lines to be put up by State Electricity Board are given below :—

Length of lines.

Details.	*Existing March* 1972.	*Anticipated.*			
		1975	1978	1981	1984
(1)	(2)	(3)	(4)	(5)	(6)
E.H.T. & H.T. in K.M. ..	8,404	10,650	13,050	14,760	17,460
L.T.	1,86,060	2,46,060	3,06,060	3,81,060	4,56,060

16.1.3 Some of the States in India have adopted 400 kv. transmission and this may be needed in Tamil Nadu also for the Inter-State Transmission System.

16.1.4 Assuming these to be the basic requirements, the following are the requirements in brief of major materials and equipment.

Towers.	*Insulators.*	*Conductors.*	*Miles.*
(1)	(2)	(3)	(4)
1 230 kv. (5 supports/mile).	2,500 Tonnes suspension.	1,500 sets ..	Kunda conductor (0·4 sq. inch cu. equivalent) 320.
2 110 kv. (5 supports/mile).	3,000 tonnes suspension strain.	3,000 ,, 600 ,,	37/11 ACSR (0·15 sq. inch cu. equivalent) 750.
3 66 kv. (Normal Span abt. 600/750 per span 9 supppports/mile.	900 tonnes suspension strain.	2,700 ,, 400 ,,	7/171 ACSR 0·075 sq. inch cu. equivalent 320.
4 33 kv. (14 supports/mile) normal span 400 ft.	RCC. Suspension Poles Strain.	3,400 ,, 2,000 ,,	7/144 ACSR 700.
5 11 and 22 kv. 300/350 per Span-13.	RCC. Poles — —	Pin 19,000 Strain 3,000	19,000 7/·102 ACSR 1,600. 3,000 7/·093 ACSR 1,600
6 L.T. Lines (16 Supports/ mile).		Pin 1,70,000 Tension 80,000	2, 4, 6 and 8 equivalent all-aluminium conductors.

16.1.5 While 230 kv. and 110 kv. lines may be on fabricated towers for 66 kv. and lines of secondary importance, RSJ supports can be used with reduced spans for economy. For 33 kv, 22 kv, and 11 kv, R.C.C. poles can freely be used as at present and with specia steel reinforcement wires that are now under manufacture in India, we may change over for prestressed concrete poles for 22 kv. and 11 kv. and L.T. lines resulting in considerable saving.

16·1.6 While ACSR Conductors can be used for 230,110 and 66 kv lines, use of all-aluminium alloy conductors for 33, 11 and 22 kv. lines could be considered omitting the steel core wire. This will increase the current carrying capacity of the line and will lead to less losses than equivalent ACSR conductors. These special aluminium alloy conductors have been used extensively to replace ACSR conductors of equivalent W/T (where W is the weight and T the tension) in other countries and for lines even up to 230 kv. it is suggested that the use of such conductors for 11, 22 and 33 kv. lines is intensified with a view to reduce line losses apart from saving in capital costs.

16·1.7. For all L.T. lines, all-aluminium conductors could be used instead of ACSR. Tamil Nadu Electricity Board have used extensively all-aluminium conductors with good results from 1948, but of late they are changing over to ACSR at high cost and increased losses for the reason that ACSR results in less breakage than all-aluminium conductors. The breakage of the conductor, if at all any, is due to over tensioning and poor erection and not due to the absence of steel wire. Such breakings are not exclusively confined to all-aluminium conductors. Experience has shown that breakages have occurred in ACSR conductors also.

17. *Lightning Arresters.*

The following 3 phase arresters would be about the annual requirements in the State excluding those required in private sector :—

11 kv	..	About 1,000 sets.
22 kv	..	About 500 sets.
33 kv	..	About 1,000 sets.
66 kv	..	About 500 sets.
100 kv	..	About 50 sets.
230 kv	..	About 20 sets.

18. *Transformers.*

18·1 The minimum annual requirements of power and distribution transformers by the Tamil Nadu State Electricity Board are given below :—

18·2 *Power Transformer—*

Details.	*Existing March 1972.*	*Anticipated.*			
		1975	1978	1981	1984
(1)	(2)	(3)	(4)	(5)	(6)
Requirement of—					
(i) Power transformer in MVA.	4,572	6,070	7,570	9,070	10,880
(ii) Distribution transformer in MVA.	2,314	3,050	3,800	4,550	5,450

19. *Switchgear.*

19·1 The annual requirements of H.T. and L.T. Switchgear for the State Electricity Board are given below :—

Details.	*Existing March 1972.*	*Anticipated.*			
		1975	1978	1981	1984
(1)	(2)	(3)	(4)	(5)	(6)
Demand for switch gear per year—					
(i) L.H.T. (Breakers)	Not available.	40	40	45	45
(ii) H.T. (Breakers) in Nos.		100	120	130	130

N.B.—The figures under switchgear relates to the breakers only. Associated Switchgears and cutouts will be required in proportionate number.

19·2 The H.T. Switchgear industry is concentrated in Bangalore, Hyderabad and Bhopal ; but Tamil Nadu has some of the best units in L.T. control gear, L.T. Fusegear and Motor Control gears. These units could be given further assistance for expansion towards balancing their production.

19·3 The porcelain base required for the L.T. fuse units are now formed in Vridhachalam and one more such centralised facility for ceramics could be developed by the State Government in or around Omalur, Salem district, to give a fillip to this industry. Very good scope exists for making L.T. fuse units and switchgears of ratings up to about 60 amperes. The Central Electrical Testing Laboratory at Kakkalur near Madras could afford all help and assistance in providing testing and development facilities for their fuse gear.

20. *Rotating equipments.*

20. With the growing tempo of industrial development and agricultural operations, the demand for reliable and good quality pumps, lifts, industrial driving motors will keep on increasing. Although there has been a very competitive market for lifts, pumps and motors, there is scope for diversification especially in the field of power-driven pumps where special purpose pumps like chemical pumps, etc., are yet to make appreciable appearance. Coimbatore is the main heart of pump industry but a majority of the manufacturers are still concentrating on the conventional agricultural pumpsets.

21. *Scope for the future.*

21. In view of the rapid development of industries manufacturing electrical goods in the coming years every effort should be made to broadbase the industries in Tamil Nadu. There is now large capacity only for manufacturing power and distribution transformers, house service metres and insulators. There may not be any immediate need for expanding capacity in the industries but in the sixth plan period, there will have to be even a doubling

of capacity in order to be in a position to meet not only large replacement demand but also additional demand for various items. The manufacture of fans of different types has to be undertaken in a big way with a promotion of one or two units. Table fans and ceiling fans will be in great demand and the consumption might increase more than fourfold in the next decade. The same units may also be equipped to manufacture fans for industrial purposes, the annual output of ceiling fans alone may have to be 5 lakh units. A large unit for G.L.S. lamps, fluorescent tubes and miniature and decorative lamps will have to be established. At present there is only one cable unit for manufacturing A.C.S.R. and other types. There are none for producing underground power cables and special types. Though the cable industry in the country has no excess capacity, the situation will be changed after some time. One large unit for producing special cables will have to be established. The aggregate investments in all sectors will be about Rs. 30 crores in the fifth plan period and Rs. 50 crore subsequently.

22. *Recommendations* : The task force recommends.

22.1 Easier flow of scarce raw materials like steel sheets has to be ensured to the various units of this industry.

22.2 At least two more units for the manufacture of Electrical Grade stampings required for small motors, Fans and Electronic Industries have to be encouraged.

22.3 Import of essential raw materials for electrical capacitor industry has to be permitted in a liberal manner.

22.4 The State Electricity Board should get all its requirements of Transformers from the Transformers manufacturers in Tamil Nadu on a preferential basis.

22.5 The Central Electrical Testing Laboratory at Kakkalur should also have facilities for L.T. Short Circuit Tests and for Testing switchfuse Units of ratings about 60 amps.

22.6 The State Government may consider developing another Ceramics Complex near Omalur, Salem district, for producing Ceramic bases for Electrical Industry.

22.7 Electrical Insulation—papers have to be developed in the State and one Unit may be encouraged exclusively for this or one of the existing units could be allowed expansion for this purpose. State Government may also have further discussions in this matter with the Institute of Paper Technology, Saharanpur and Forest Research Institute, Dehra Dun.

22.8 Two more Units for producing miniature lamps have to be encouraged immediately.

22.9 In order to meet the ever-increasing demand for lamps, one unit for producing G.L.S. and Mercury lamps and two or three small units for making lamp-ancillaries have to be organised early.

22.10 The State Industries Department should have a branch exlusively for Electricals under a Technical Officer of the status of at least a Joint Director.

22.11 A fully-equipped Tower-testing yard may be set up by the State Government for testing Transmission Towers and Railway Electrification Towers.

22.12 The requirements of R.S.J. supports, R.C.C. Poles and line hardware required by the State Electricity Board have to be procured from Small Scale Industries in consultation with the Director of Industries.

TABLE I.

TAMIL NADU STATE ELECTRICITY BOARD PROJECTED DEMANDS.

Details.	*Existing March* 1972.	*Anticipated.*			
		1975	1978	1981	1984
(1)	(2)	(3)	(4)	(5)	(6)
1 Generation capacity in M.W. ..	1,150	1,777	2,441	Not finalised.	
2 Power Demand M.W.	1,326	2,000	2,640	3,760	5,340
3 Requirement of—					
(i) Power Transformer in MVA.	4,572	6,070	7,570	9,070	10,880
(ii) Distribution Transformer in MVA.	2,314	3,050	3,800	4,550	5,450
4 *Length of Lines*—					
E.H.T. and H.T. in K.M. ..	8,404	10,650	13,050	14,760	17,460
L.T.	1,86,060	2,46,060	3,06,060	3,81,060	4,56,060
5 Demand for Switchgear per year—					
(i) L.H.T. (Breakers)	Not available.	40	40	45	45
(ii) H.T. (Breakers) in Nos.		100	120	130	130

N.B.—The figures under switchgear relates to the breakers only. Associated Switchgears and cut outs will be required in proportionate number.

CHAPTER X.

Electronics.

1. *Introduction.*

1.1 Electronic Industry offers a ratio of investment to annual production ranging from 1 : 4 for radio receivers and certain consumer electronics products to 1 : 2 for computers and data-processing equipment. In contrast, the corresponding ratio in the case of the steel industry or the heavy chemical or petro-chemical industry is less than 1 : 0.5.

1.2 Among the sophisticated science-based industries, Electronics is unique in being highly employment intensive. The investment per worker in the Electronic Industry is typically of the order of Rs. 5,000 whereas the average turnover per person directly involved in production is of the order of Rs. 20,000. The relatively smaller outlay in fixed assets per worker will enable a larger generation of employment with a spurt in demand for electronic products.

1.3 In the pre-independent era, Electronics, has a primitive status. Broadcasting has been established as also the Overseas Communication Service with facilities for international telegraph and telephone working. The Posts and Telegraphs Department, the Railways, Civil Aviation and the Defence Services were using imported electronic equipment. The domestic radio receiver industry was growing up ; but it was based exclusively on imported components and borrowed know-how. A comparatively small number of engineering graduates was being trained in the fields of Electronics and Communication Engineering. There was no evidence of any significant research or development effort.

1.4 In 1947, there were only 3,00,000 radio receivers, in use all over the country while the manufacturing units were turning out a mere 4,000 receivers. There were only a small number of low and medium power broadcast stations and a tele-communication system catering to 1,00,000 telephones. In 1948, the Indian Telephone Industries was set up to produce telephones, carrier-systems and related equipment. Aided in its early years by collaboration with the Automatic Telephone and Electric Company of England and working now in close co-ordination with the Tele-communication Research Centre of the P. and T. Department in Delhi, the Indian Telephone Industries limited has quickly assured a self-reliant attitude and has increased the quantum and quality of the equipment that it produces to the point when it is able to export items and compete successfully in the World market in certain areas.

1.5 The vital need to produce professional electronic equipment, primarily to meet the requirements of the Defence services, led to the establsihment of Bharat Electronics Limited in Bangalore in 1954. Owing to the complexities in the nature of the requisite equipment and the wide spectrum involved, as well as the rapid changes taking place in the form and structure of the devices, techniques and equipment, this Establishment has had formidable challenges to face right from the inception. Based on the need to

register quick progress in some directions, the Factory has had to embark on a programme of license arrangements with a multiplicity of foreign collaborators, with the main objective being to achieve certain important production targets. As the factory is expanding its scope and gathering the much-needed momentum in its production activities, a re orientation of the basic philosophy is taking shape with increasing stress on indigenous development work and an attitude of self-reliance.

1.6 During the last twenty years, a number of research laboratories and institutions in the field of electronics, have been established and are making steady progress notably the Central Electronics Engineering Research Institute at Pilani, the Electronic Division at the National Physical Laboratory at Delhi and at the Tata Institute of Fundamental Research and the Bhabha Atomic Research Centre in Bombay, and the Telecommunication Research Centre of the Post and Telegraph Department in Delhi. Under the aegies of the Defence Science organisation, the Electronics and Radar Development Establishment in Bangalore, the Defence Electronics Research Laboratory in Hyderabad and the Solid State Physics Laboratory in Delhi are engaged in a study of problems relating to Defence Electronics and have set in motion fruitful programmes of research and development activity. The Electronics Division of the Trombay Automic Enegry Establishment pioneered the design and construction of instrumentation systems for automic reactors and power stations. The formation in 1966 of a full-fledged commercial organisations, the Electronic Corporation of India Limited in Hyderabad as a spin-off from the activities of the Bhabha Automic Research Centre augurs well for a wholesome national effort in the areas of design and development of nuclear measuring instruments, medical electronics equipment, professional grade electronic components, control devices and special-purpose eletronic computers.

1.7 However, a view of the national Electronics Industry as a whole, reveals that bulk of the present established capacity pertains to the area of radio receivers and allied consumer products. There is a reasonably good foundation for the production of line-communication equipment and nuclear medical industrial apparatus. But modern, sophisticated techniques of production are yet to be introduced in any significant measure. The production of high-grade components for the Electronics Industry is in its infancy in this country. For microwave systems, radio navigational aids and advanced communication equipment and computer systems, no appreciable manufacturing capacity has been established yet.

2. *Primary Materials.*

2.1 Many of the primary materials required for the Electronics Industry are themselves products of other Industries such as special resins, paints, enamels, electrolytically pure aluminium and copper. There are several materials which are to be specially prepared by sophisticated methods, like semi-conductor grade germanium and silicon. Existing industries have the capacity to produce materials in the former category. Capacity for the special materials has yet to be established.

3. *Electronic Components.*

3.1 In the area of components, a base exists but it is small and has haphazardly developed. Bharat Electronics leads in the manufacture of components like receiving tubes, semi-conductor diodes and transistors, piezo-electric crystals, mica and ceramic capacitors and transmitting tubes. The Indian Telephone Industries produce wire—would resistors, styroflex, capacitors, and a wide range of components which find application in line communication practice. The Private sector industry makes several types of resistors, capacitors, connectors, relays switches, wires, cables and printed circuit boards, Electron tubes and devices and a good many other items. Whether in the private or public sector, they are being manufactured to foreign designs and with foreign manufacturing know-how and all the requisite primary materials are imported. Likewise, Electronic Corporation of India Limited, have also taken up manufacture of precision components like resistors and capacitors. Advanced Electronic equipment cannot be designed and built without components of the highest quality and reliability. A comprehensively organised materials and components industry is the very backbone of the entire development process. Considerable effort will be required to keep pace with the rapidly evolving new devices and techniques. The materials and components industry will have to be given a strong scientific base with inter-disciplinary research and development groups capable of striking out on their own and yet remaining abreast of current developments in advanced countries.

4. *Electronic Equipment.*

With regard to equipment particularly of the professional grade, the right approach will be to promote as adequate research and development effort in the manufacturing plants and to insist on a provision where by components specified by the collaborator may, wherever, feasible, be substituted by indigenously made components or those obtained from elsewhere at competitive prices. There should be a further provision that the technique and know-how obtained for a certain device or equipment can be applied, without payment or royalties, to other devices and equipment in the same or related class.

4.1 In 1966, the total magnitude of the design and development effort, in financial terms, was estimated to be Rs. 4 crores, engaging a task-force of 4,000 professional personnel. From 1967 onwards, there has been a conscious attempt to step up the tempo of research and development activity. Organisations like the I.T.I. B.E.L. and E.C.I.L. have increased their outlays on research and development to the tune of 5 per cent. Private sector undertakings are also stepping up their outlays to meaningful levels.

4.2 A factory has been set up in Kotah, Rajasthan for the manufacture of process control instruments. Another establishment, in Hyderabad, under the aegis of the Hindustan Aeronautics Limited, is engaged in the development and production of various types of bourn equipment and electronic equipments for missle systems. Work started in the area of micro-electronics at the Tata Institute of Fundamental Research, Bombay, Central Electronics Engineering Research Institue, Pilani, Solid and State Physics Laboratory, Delhi and Bharat Electronics, Bangalore and National Physics Laboratory, New Delhi and in the area of Satellite Communication at the earth station in Arvi near

Poona. Thumba near Trivandrum and Sriharikota near Madras and the Radio Telescope establishment at Ootacamund represent healthy indigenous efforts to achieve self-reliance in design, development and engineering, erection and Commissioning of equipment and systems in electronics in line with the advancing state of the art.

4.3 Much headway has to be made in the area of electronic equipment for industria applications—closed circuit television for use in industry, medicine, and education electro medical apparatus, data-processing equipment and computers.

6. *Computers.*

5.1 A viable national plan for computer development is taking shape. A report, prepared and presented to the Government of India by a Working Group towards the end of 1968 has recommended the establishment of six national/regional computer centres with large, modern, imported systems in different parts of the country, hundred medium systems in the commercial area, and 100 medium and small systems for the laboratories; defence establishments and educational institutions—calling for an outlay, over a ten-year period, of Rs. 160 crores. It is likely that, except with regard to the big national centres, the needs of the medium and small systems including programmed processors, real-time processors, etc., desk calculators and interface electronics will be met wholly from a programme of indigenous production. High priority will be accorded for achieving self-sufficiency in the production of the following : digital logic, i.e., modules, discrete active components, ferrite cores for memory systems, console typewriters, line-printer ribbons, digital recording tapes, plotter paper, glass epoxy laminates, wires, cables connectors, relays, switches, neon indicators, nixie tubes, etc. There will be major effort in developing indigenous soft-ware capability and in systems—engineering and the training for personnel for the relevant tasks.

6. *Space Research Programme.*

6.1 The outline of the country's space research programme presented by late Dr. Vikram Sarabai in July 1970 has the profile of development covering the decade 1970-80 calling for an investment of Rs. 165 crores and the following major features :—

(*a*) the development of indigenous competence for designing and building the hard-ware required in space technology, including rockets and satellites for scientific research and practical applications ;

(*b*) the use of the above for providing point-to-point communication and a national television service through a direct broadcast synchronous satellite ;

(*c*) the application of satellites for meteorological purposes and for the remote sensing of earth resources.

6.2 Inspite of all our practical difficulties, it is hoped that by 1974-75, there will be an Indian made communication satellite in orbit, turning into reality the dream of national television coverage a set in each of the 560,000 villages at the rate of 100,000 per year, in 5 years during 1975–80. The Satellite will provide as many as 3,600 high quality telephone channels and 3 television channels. It will earn revenue by leasing out time for

handling commercial telecommunication traffic . It will make possible reliable weather forecasting with consequential saving in human life, property, crops, etc., and augment our capability and expertise in rocket technology which is so important to our national security.

6.3 In Tamil Nadu, the first impact of Electronics has been on the Domestic Radio Receiver, which has taken roots. Till about the end of 1965, the Electronic Units in Tamil Nadu were mostly confining to Entertainment equipments, particularly assembly and repair of radio receivers and amplifiers, except only one unit set up in 1962 manufacturing Carbon Track Volume Controls under collaboration with Messrs. Morganite, U.K. One more such unit has come up during 1969 in collaboration with Messrs. ALPS, Japan. Two units in the larger sector have been producing sophisticated and specialised Electronic Instruments like power supplies, signal generators, etc. One of these units have also organised a very good Research Development Sector, which is available to the industry.

6.4 The following represents the latest situation.

Item.	*Number of units existing.*			*Number of units expected in the next 3 years*		
	Small Scale Sectors.	*Other Sectors.*	*Total.*	*Small Scale Sectors.*	*Other Sectors.*	*Total.*
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. Radio Receivers, Amplifiers, etc. ..	109	..	109	15	..	15
2. Instruments	6	2	8	20	10	30
3. Components	10	1	11	30	15	45
4. Auxiliaries	..	..	..	25	10	35
Total	125	3	128	90	35	125

6.5 It is heartening to note that quite a number of small scale units, most of them sponsored by highly qualified technocrates, have been coming up manufacturing essential components like Resistors and Capacitors, Instruments and sub-systems like process controls of very good quality.

6.6 Apart from the above units in the private sector, the signal telecommunication workshops of the Southern Railways and the Police Radio Unit in Madras have developed a few professional equipments like Microwave Transmitting Units and V.H.F. Communication units intended for their respective fields . These units offer good scope for expansion and intensification.

6.7 Tamil Nadu with its abundant manpower and skill eminently suited for sophisticated industries offers a good scope for a variety of Electronic items both as original equipments and ancillaries for the larger units like Indian Telephone Industries, Bharat Electronics and ECIL.* As a first step toward creating a suitable climate and infrastructural facility for developing this industry, a composite functional industrial estate for Electronics Instrumentation has been set up by the State Government into the CSIR complex and the higher technological institution like the Indian Institute of Technology and the College of Engineering with whom some testing and development facilities are already

* Electronic Corporation of India Limited.

existing. This estate which is located in a site free from radio-interference, vibration and dust, will ultimately have 45 specially designed factory-sheds for housing the small scale units engaged in making the various electronic items. The first phase of this Estate with 18 units has already been completed and given out on hire-purchase basis to entrepreneurs most of whom are Technocats. This complex is expecting to have very soon a testing, product-development and certification laboratory as also a service centre for Electronic equipments. The complex is only about 4 miles from the airport and possibilities of setting up a Duty-free zone for air-lifted components are also bright.

6.8 Madras is expecting to be hooked into the country's Television network by 1974 and this will not only give rise to a demand for T.V. receivers but also create a large number of servicing and repair units. The existing production capacity of Television Receivers in the country is around 30,000 per year and this is now being increased to around 2,00,000. The small scale sector will no doubt get its due place in the capacities to be created. At least 60 per cent has to be insisted for small scale sector. In this State, one unit in large sector with 20,000 sets per annum and one unit with 10,000 sets in small sector has to be insisted upon. The developments made by the CEERI Pilani for T.V. Receivers, Vidicon Camera, T.V. Annae, Deflection coils, etc., can be made full use of by the industry.

6.9 The State Government are setting up a Science Centre for Electronic Ceramics in the Ceramics Complex, Vridhachalam, for making available body mixtures for soft ferrities, etc., to the Small scale Sector for fuller processing and getting them for final fixing at Controlled temperature. This unit has a very important role in giving the required structure to the sophisticated branch of Electronics Industry.

6.10 The National Laboratories like National Physical Laboratory, New Delhi, Central Electro-Chemical Research Institute, Karaikudi, National Chemical Laboratory, Poona and the Central Electronics Engineering Research Institute, Pilani have developed a large number of components and accessories for the Electronics Industry like Nickelcadmium cells, Metal Oxide Resistor, Capacitors, Ferrites, Recording heads, Microphones, etc., and the small scale sector could certainly make fullest possible use of these process and developments.

7. *Process Electronics.*

7.1 Data logging uses electronic techniques for recording the performance of installations controlling physical and chemical processes in which the control functions are basically performed by human operators. However, it is usually more profitable to delegate many of these control functions to mechanical operators or control systems. This logic classifies the process control of any industry as (*a*) systems which present the data collected known as transducers to a processor, (*b*) the central data processer (*c*) the actual control unit executing the command of the processes. The transducers, depend upon the type of the industry and the variable which is being controlled.

7.2 When a complete industry is set up, then the transducers and control equipment are decided and after that it is going to be a modification of the existing unit. But some of the transducers like LVDT, synchros, servomotors, etc., are quite common and these can be produced on large scale. But in general, a transducer is normally a custom built item.

The data processing unit can be analog or digital. In Industries, where the total cost of the processing system is comparable with that of the overall system, the digital units are not preferred and usually the former, in its simplest form is made use of.

7.3 A typical example of the analog type, which is found in almost all the industries in one form or other is the temperature programmer, controller-*cum*-indicator. The specifications of these units differ, but if the unit is made to cover a wide range of temperature, this has a potential market. One or two firms are making these units in India but a majority of them are imported along with the technical know-how. The initial investment to make these units need be small and as such a small scale industry can take up the production of these.

7.4 Minidigital computers, produced at low cost have a great demand. As the overall performance of the process depends upon the computer, it is imperative that the computer should be highly reliable under varying environmental conditions. These have to work 24 hours a day with nodown time for routine maintenance. The reliability needed is very much high over 99 per cent and the operating speed takes a second from the process in many forms, continuous or discrete. It should have facilities for time sharing with other processing units and should be possible to increase the number of process inputs.

7.5 The industry manufacturing digital computers will boost up the production of high quality, reliable passive and active discrete as well as integrated circuit components. In addition as a development, large-scale integrated computers can be taken up bringing down the price and size and improving the reliability. This results in an overall electronics industrial growth in Tamil Nadu. The above said minicomputer in a slightly modified version can be used in the machine tool industry for the numerical control of machine tools. Yet the numbers are fewer than those required for intensive degree of automation. The machine control unit interprets the instructions given through a punched or magnetic tape and directs the machine through the required operation with a combination of speed, accuracy and consistency. The initial investment for numerical control machines will be quite high, but the industries are assured of the returns in a span of 3 to 6 months.

7.6 Another field where a data processor can be of immense use is in the medical units. Routine administrative work to monitor the patient's condition in times of heart rate, blood-pressure of temperature can be done leading to an early diagnosis and treatment. In addition, routine medical check up for everyone, as in Western countries, can be made possible. It is also possible to build an air traffic control simulator using this mini-computer to train the air traffic control personnel on up-to-date manoeuvres to be perfected before they are put into general use. The computer makes the entire operation very simple and will be of maximum training value to the Defence personnel. In addition, it can be used for strategic planning as well.

7.7 There are only two firms manufacturing computers in India but a large demand can be created by developing a Nucleus for training engineers to study the various industries with an objective of introducing suitable modifications in the process so as to enable this mini-computer being installed. A strong recommendation for manufacturing a low cost mini-computer is made.

7.8 The industry to produce digital computers for process may be taken up with a top priority, which in turn necessitates the development of components and ancillary industries. Integrated circuits and consequently large scale integration will be making the entire electronic equipment including the computers cheaper, smaller in size and more reliable. As the initial investment to manufacture these devices will be quite high, only a large-scale industry can take up the production of these items.

ANNEXURE I.

LIST OF PROCESS ELECTRONIC EQUIPMENT WHICH CAN BE TAKEN UP FOR BATCH PRODUCTION.

Textile and Jute industries.

1. Yarn irregularity recorder and automatic slubcounter.
2. Fabric cover factory tester.
3. Lusture/Brightness tester.
4. Auto-leveller.
5. Eveness testing machine.
6. Trash analyser.
7. Fibrograph.
8. Moisture meter.

Cement industries.

1. Electronic weighing unit.
2. Speed control unit.
3. Temperature programmer-*cum*-controller.

Pharmaceutical, Plastic and Chemical industries.

1. Electronic weighing, packing units.
2. Ultrasonic cleaning units.
3. Ultrasonic Plastic welder.
4. Temperature programmer, controller-*cum*-indicator.

ANNEXURE II.

Electronic industries.

1. Printed circuit package units.
2. Digital display units.
3. Digital logic modules.

Machine Tool industry.

1. R.F. heating units.
2. Electronic timers.
3. Welding control units.
4. Control consols for N/C Units.

8. *Medical electronics.*

8.1 From the medical application point of view instruments may be classified as being, used in (*a*) Diagnosis, (*b*) Therapy and (*c*) Prosthesis.

(*a*) Instruments used for clinical investigation, e.g., Electro-cardiograph, Temperatrature Monitor, Oxygen Gas Analyser.

(*b*) Instruments used for curing, e.g. Diathermy, Stimulator, Respirator.

(*c*) Instruments used as a substitute for some organical function of the body, e.g. Myoelectric control of limbs, blood pumps and controls.

8.2 There are only a few companies or firms in India engaged in manufacture of medical electronics equipment and there should be plenty of scope for new comers. From the manufacturing point of view, the conditions as regard investment, availability of raw materials, skilled labour, testing facilities, etc., medical electronics or process controls, the demand and marketability will of course have to be studied. On the face of it, this demand should be extremely good, provided the cost of the instruments is based on actual manufacturing cost and reasonable profits. In making instruments which have hitherto been imported the temptation is to price the instrument based on the price of imported instruments.

9. *Electronic components.*

9.1 The Bhabha Committee estimated the need for electronic industries in India at Rs. 1,650 crores till 1975–76. The estimate was, however, made by a group of the most competent experts in the fields and their report itself will ever remain the first and foremost authoritative basis for all our subsequent thinking on the subject. The Committee estimated the turnover in India for 1975 at Rs. 28 crores for primary materials and Rs. 84 crores for electronic components, resistors, capacitors, semi-conductor devices and others. It is desirable that Tamil Nadu plans to set up by 1975 manufacturing units capable of a turnover of at least 5 to 8 per cent of the above figures.

9.2 The present production of components and primary materials in Tamil Nadu is not appreciable. Except for the unit at Guindy, making volume controls, the other two or three units making electronic components had their start during 1969–70 and they are slowly getting over their teething trouble. Starting necessarily from near scratch, as we are now, we can by-pass production of components and materials that tend towards obsolescence and concentrate only on the manufacture of such of those components that are coming into vogue, or are likely to continue in vogue for some considerable time. Such a "leep-froging" programme will enable us to jump the technological gap and to start and proceed abreast of other advanced countries in the field.

9.3 Resistors and capacitors are the basic components used in the electronic industry. They should be primarily cheap for use in entertainment electronics, accurate and reliable irrespective of cost considerations for use in defence equipment, and of an intermediate class, that is of adequate reliability at reasonable cost, for use in the industrial field. Carbon composition or metal oxide film resistance, wire-wood resistors and potentiometers, are among the spheres of production to be encouraged and planned for. A tinoxide

resistor with high temperature stability has been developed in the C.E.C.R.I., Karaikudi and it can be further improved and adopted towards large-scale production. One unit in the small-scale sector has been set up near Madras based on this process. Plastic-film and ceramic capacitors, Aluminium and Tantalum electrolytic capacitors may also be taken up for immediate production. A recent statistical report brought out by the Electronic Commission envisages, during the next two or three years, an increase in production by a factory as much as five or six for the components like carbon resistors and styrofl, polyster, ceramic and electrolytic capacitors. These are the key components for which there will be a large demand. Tamil Nadu can well plan to produce them. But the plans for their manufacture should be in the large or at least medium scale sectors, if these costs are to be kept within economic and competitive limits. Strict conformity with stipulated tolerance standards is to be ensured.

9.4 Miniaturisation is an important consideration to be stressed. Production of primary materials for such manufacture can be incorporated in the main plant or with greater efficiency in satellite units in the small-scale sector. Solid state silicon device transistors and semi-conductor diodes are fast replacing conventional high vacuum tubes even in the entertainment field, and more so, in industrial and Defence equipments. Though they are being produced or licenced to be produced in the country, no unit has so far been licensed in Tamil Nadu.

9.5 Initially some useful sub-assemblies incorporating these solid state devices can be taken up in small-scale units. Printed circuit sub-assemblies, on single, double or multilayered boards, using flow soldering techniques, are immediately feasible. The procedures involved are simple. Raw materials and chemicals are indigenously available. Glass fibre reinforced plastic boards are developed in the N.A.L., Bangalore. The C.I.P.E.T. at Guindy and the Petro-Chemical Complex at Manali can help development of suitable copper-clad boards. Even if one or two units making printed circuits are already in Madras, there is good potential for including a few more units in our current planning. An allied field is the manufacture of high quality connectors for use in conjection with printed boards. Dependable connectors are at present leargely imported. One or two units to manufacture such connectors can also be included in our plan. Firm plastic mouldings and spring type terminals to ensure long-life positive contacts should not be difficult to produce. Linear, 8, 16 and 32 terminal connectors are generally in demand.

9.6 The advent of integrated circuits is fast revolutionising the electronic industry. The difference between components and systems, discrete devices and circuits, is fast disappearing. I.Cs., especially of the digital types, will have an extremely large field of application in the near future. Large scale Integrated Circuits (L.S.I.) will be exclusively used in computers, mini-computers and desk calculators. A rapid increase in demand for computers and mini-computers is expected within the country. There is also a fast expanding market for electronic desk calculators as they require no prior knowledge of programming. Transistorised versions of T.V. Receivers will also use semi-conductor devices and I.Cs., in a large way ; and television will receive a boost within the country in the coming years. According to a world survey by an American firm, the use of monolithic I.Cs., have already increased by more than 40 per cent and used in all equipments, where they are rapidly replacing discrete devices. Their rate of utilisation will further increase very rapidly.

We can well plan for the production of at least a few simple types of I.C's. small-scale integrated devices (S.S.I.) which are currently in large demand. The Tata Institute of Fundamental Research, Bombay, have already developed some technology for the I.C's. and large scale units based on this know-how could be planned without any loss of time in Tamil Nadu.

9.7 Kits of components and parts for desk calculators can be easily imported on the specific understanding that the finished instruments after fabrication here are reported to the suppliers on a cent-per-cent basis. No foreign exchange is required and indeed some foreign exchange can be earned by this. One or two units can be started on those lines. Based on the knowledge gained thereby regarding the solid state components and micro-electronic chips, these units can develop even further so as to produce those devices at a later stage.

9.8 In addition to the components mentioned above, other units can be included in the plant to manufacture electronic hardware and accessories such as terminals, plugs, connectors, coaxial cables, wave guides and wage guides transitions for micro-wave equipments, antennas for radio television and micro wave system , etc.

9.9 It may be worth pointing out in this connection that it is pragmatic to determine priorities relative to actual demand rather than to probable growth indices which can at best be a guess. It is suggested that a detailed survey is made of existing manufacturing units in Tamil Nadu and neighbouring States. The products they produce, their turn-over the electronic components they produce and sub-assemblies that go into their products, the difficulties they encounter in their procurements, the foreign exchange they utilise, etc., are to be studied. End-use orgnaisations like ICG., Railway and other big workshops, Police and Traffic Departments, Tambaram and Avadi Military Establishments, A.I.R., Hindustan Photo Films, Hindustan Teleprinters, Tank Factory and similar institutions besides electronic manufacturing units are to be included in the survey. On the strength of the information gathered thereby, it will be possible to plan for our new units in the small and medium scale sectors so as to gear them to the bigger units on a strict demand and supply basis. This survey is best done by the State Industries Department, who have already done some pioneering work in this field.

9.10 Electronic Industry is also a highly specialised one, requiring theoretical and technological knowledge of a high order. If the right type of entrepreneurs are to be attracted to the industry, Government help and guidance have to be freely made available to them at all stages and in all levels. This may take different forms. In addition to the Testing and Evaluation Laboratory in the Adyar Estate, testing facilities are to be provided in other institutions such as I.I.T., M.I.T., Guindy Engineering College, Fundamental Engineering Research Establishment under the Directorate of Technical Education snd other similar institutions. It is heartening in this connection to note that besides CSIO., Chandigarh, CEERI, Pilani are also coming shortly near the Electronic Complex in Adyar. Suitable liaisons are to be established at Government level with the different R and D Centres within the country.

9.11 A duty-free zone for important electronic raw materials and parts and export of finished components and systems, is being set up around the International Airport at Bombay and a similar zone may be thought of for Madras also. The State Government have already moved the Electronic Commission in this regard and this has to be pursued vigorously.

10. *Electronic Test Instruments.*

10.1 At the present moment the concentration of electronic industries are to be found in Maharashtra, Delhi, Hyderabad and Bangalore regions.

10.2 Although a variety of components and equipments are produced in the units situated in the above regions it is not known whether any significant development has taken place in regard to sophisticated electronic tests instruments. The broad range of instruments are given below :—

10.2.1. *Signal Generators—*
AM Series.
FM Series.
AM/FM Series.

10.2.2. *Oscillators and Wave Generators—*
R.C. Oscillator.
A.F. Oscillator.
Two Tone Signal Source.
Double Pulse Generator.

10.2.3. *Attenuators—*
A.F. Ranges.
M.F. Ranges.
R.F. Ranges.

10.2.4. *Meters—*
Valve Voltmeter.
Differential DC. Voltmeter.
Digital Voltmeter.
AF Power Meter.

10.2.5. *Analysers and Test Sets—*
Wave Analyser.
Distortion Factor Meter.
MF Transmission Measuring set.
FM Deviation Meter.
Modulation Meter.
HF Spectrum Analyser.

10.2.6. *Television Measuring Equipment—*
Sine—Squared Pulse and Bar Generator.
Colour Gain and Delay Test Set.

Blanking and Sync Mixer.
Transmitter Sideband Analyser.
Sweep Generator.

10.2.7. *Multi-channel Test Equipment—*

White Noice Test Set.
Pattern Generator and S.L.M.S.
(Select Level Measuring Set).
Quantization Distortion Tester.
(Noise Generator).

10.2.8. *Bridges—*

Inductor Analyser.
Universal Bridge (Including RF).
V.S.W.R. Indicators.

10.2.9. *Circuit Magniafication Meter.*

10.2.10. *Oscilloscopes.*

10.2.11. *Electronic Counters—*

A few of the instruments listed are produced in this country with or without foreign collaboration, including the one unit located in Madras. Tamil Nadu holds a potential for the development of sophisticated electronic instruments. The recent establishment of regional centres of various national institutions in the composite C.S.I.R. campus at Adyar, could well provide a starting point for development in this direction.

11. *Prospects for Future.*

11.1 The Electronics Industry has a great future and in the next two plan periods high priority will have to be accorded for the development of industrial units which will not only manufacture radio receivers and transistors, televisions sets, record players, tape-recorders and various other items needed by individual consumers but also tele-communication equipment, transmission equipment, items required for the defence services, computers and the electronic gadgets required for industrial processes, medical men and others. Space research also opens up new possibilities and the planners job will indeed be embarassing as they will be at a loss to find out which of the many schemes should be taken up first and how the resources in terms of men and material should be found.

11.2 There will of course, have to be mass production of radio receivers and transistors, microphones and other public address systems, telephone receivers, machinery needed for automatic exchanges, electronic components and broadcasting equipment for Radio and Television purposes. In spite of the impressive progress recorded in many directions in the past decade, particularly, there is an unsatisfied demand for many items and the back log of application for telephone connection particularly will grow in the coming years even with an increase in the output of the public sector units unless there was intensive development of manufacturing facilities in the different parts of the country.

11.3 The Indian Telephone Industry has of course grown greatly in stature, but even with a phenomenal growth in its production and a diversification of the manufacturing lines the posts and telegraph department does not feel confident that it can catch up the demands of telephone subscribers even by the end of this decade. There was only one telephone for every 2 lakhs of the population at the beginning of the plan era. There are now nearly 11 lakhs telephones working out to one telephone for every 50,000 of the population. The additions are now taking place at the rate of one lakh telephones annually and it is expected that at this rate, it will have to be increased to 2 lakhs by 1978–79. A conservative estimate places the aggregate requirements by 1983–84 at over 12 million telephones. In regard to the radio receivers and transistors, annual production is around 2·5 million sets while the total of licences issued is over 13 millions. This increase in production may have to be nearly doubled in a short period and by the end of the 5th Plan, the rate of production may be in the region of 5 million radio receivers and transistors annually and by 1983–84, one and a half times this figure and 7·5 million units. This is a measure of the growing importance of these industries and the formidable task ahead for the industries concerned.

11.4 The Central Government is aware of the need for stepping up production of telephone instruments, exchange equipments coaxial cables and various other related items. A sister unit of ITI is proposed to be established in Uttar Pradesh and another cable factory in Andhra Pradesh. But these additions to capacity will not suffice. As considerable experience has already been gained in the manufacture of telephone receivers and equipment for exchanges, it will be advisable to have separate units for manufacturing different items and also promote electronic industrial estates around each unit. No industry lends itself to close co-ordination between large and small units as in the case of the Electronic Industry. The manufacture of components, which are not intricate and which can be standardised, can be undertaken by small units in industrial estates with the supply of raw material and technical assistance. The processes and changing technology also may be provided to these estates as and when found necessary. What is really needed is the institution of training facilities all over the country and the imparting of practical training to Electronic Engineers Diploma holders unless immediate attention was paid to this aspect of the problem, the desired progress cannot be made by the different industries.

11.5 Tamil Nadu should get located a new unit in the Central Sector for telephone receivers and in the manufacture of components for Radio receivers and transistors. Only the more intricate parts calling for a high degree of technical expertise and investment should be taken up by large scale units. There will also have to be a big plant in the private sector for manufacturing radio receivers and transistors and electronic equipment for television transmission and reception. Tamil Nadu is ideally suited for this purpose as its manpower can usefully harness for undertaking skilled jobs. Already, some units in the private sector, have started the manufacture of Electronic components for polyphadie metres, radio receivers and transistors and some work is being done also for the defence service. There are also research facilities and good progress has been achieved in some direction; but the stage of development of the industry is far behind that of many other States and in view of the vast potentiality that exists and the capability that is

available the State Government should see to it that new Central Sector Projects are located in Tamil Nadu and special incentives also are provided for the development of these industries in the private and joint sectors. The investment involved will not be huge but the results can be truly amazing and the problems will relate to the availability of technical personnel, raw material and components. A special cell in the development directorate will have to be created for co-ordinating the activities of the different sectors and for maintaining liaison with industries in other States and the development wing of the Central Government. A minimum investment of Rs. 50 crores may be required in the Fifth Plan Period alone and another Rs. 100 crores in the Sixth Plan.

12. *Recommendations.*

12.1 State Government may also propose setting up functional Industrial Estates for Electronics and Instruments in other towns like Coimbatore, Madurai and Trichy.

12.2 Expeditious action has to be pursued for locating Duty-free zone for Electronic equipments and components in Madras for promoting exports.

12.3 The setting up of a Centralised Testing, Certification, and product Development Laboratory with common service facilities for Electronics Industry at the Adyar Electronic Complex should be expedited and the Electronics Commission and the CSIR have to be fully associated in this.

12.4 The primary raw materials required for the Electronics components industry have to be permitted to be imported for at least five years more to stabilise the quality of the components.

12.5 The State Small Industries Development Corporation (SIDCO) has to pool up all Small import licences for Electronic and allied industries and arrange for direct import and distribution. Some of the more important and critical raw materials required for this industry may be stocked in bulk by SIDCO and released to the industry at reasonable price.

12.6 The State Government should have a Standing Committee to deal with all aspects of development of Electronics. This Committee has to keep in close liaison with the Central Government, Electronics Commission, CSIR, and the industry for a systematic development. It should also have one exclusive branch under the Industries Department to look after the Electronic Industry.

12.7 The list of items offering scope for development in Tamil Nadu has to be kept and updated by the State Industries Department and ' Information Sheets ' on these made available to entrepreneurs.

12.8 The Polytechnics and Industrial Training Institutes should have their curriculam on Electronics or Instruments suitably oriented towards the industrial development instead of being more academical.

12.9 The Women's polytechnics in the State should cover all aspects of Electronics instead of confining to only Radio Engineering. The Diploma should be termed as " Diploma in Electronics" and not "Diploma in Radio Engineering (D.R.E.)" as existing at present

12.10 At least 60 per cent of the assembling capacity for T.V. Receiver sets should be earmarked for small-scale sector. One unit in the major sector with at least 20,000 sets capacity and another unit in small scale sector with at least 10,000 sets capacity should be insisted for approval in Tamil Nadu.

12.11 The proposed Standing Committee has to keep in liasion with major producers like Bharat Electronics, ITI, ECI (L) and other organisations like Thumba Station and Atomic Energy Establishments to assess requirements of components and sub-system and channelise the information to the industry for a successful ancillary development. This should cover Process Electronics, Instrumentation Medical Electronics, Components Sub-assemblies and Hardware.

12.12 Reservation in S.S.I. Sector : Such of those components, instruments or ancillaries which are within the capacity of small scale industries should be reserved for that sector and the major sector can concentrate on more specialised lines.

12.13 One major unit for the production of integrated circuits has to be set up quickly utilising the know-how developed at the Tata Institute of Fundamental Research, Bombay.

TABLE I.

ELECTRICAL AND ELECTRONICS INDUSTRIES IN TAMIL NADU.

Item.	*Large Scale Sector.*	*Small Scale Sector.*
	Number.	*Number.*
(1)	(2)	(3)
1 Boilers for power Generation Equipments	1	..
2 Power and Distribution Transformers	3	..
3 Switchgear including Motorgear, Controls, Relays, Isolators, Starters, etc.	17	35
4 Conductors, Cables including Winding Wires ..	4	20
5 Insulators, Bushings and Lightning Arrestors ..	2	..
6 Electric Motors	16	30
7 Electric Pumps	10	20
8 Lamps	2*	3†
9 Appliances including Fans, Heaters and Accessories.	..	8
10 Telecommunication equipments	1	(Central Public Sector)
11 Electronic Components	5‡	6
12 Electronic Instruments and Equipments including Radio, etc.	3	20

* These are not working now.

† Of these, two are for Miniature Lamps.

‡ Only one of them is under production. Others are still in the stage of letters of intent.

TABLE II.

Functional Blocks in Instruments.

Serial number, tyre and name.	*Instruments.*				
	Power supply.	*Input transducer.*	*Input electrodes.*	*Wave form generator or oscillator.*	*Amplifier.*
(1)	(2)	(3)	(4)	(5)	(6)
1 D Electrocardiograph	+	—	+	—	+
2 D Electromyograph	+	—	+	—	+
3 D Electroencephlograph	+	—	+	—	+
4 D Strain Gage Pressure Monitor ..	+	+	—	+	+
5 D Electronics Tonometer	+	+	—	+	+
6 D Electromagnetic Flow meter ..	+	+	+	+	+
7 D Spirometer	+	+	—	+	+
8 D Temperature Monitor	+	+	—	+	+
9 D Thermograph	+	+	—	+	+
10 D PH Meter	+	+	+	—	+
11 D Oxygen Saturation Meter	+	+	—	..	+
12 D Oxygen Gas Analyser	+	+	—	—	+
13 D Katharometer	+	+	—	+	+
14 D Plethysmograph	+	—	+	+	+
15 D Audiometer	+	—	—	+	+
16 D T & P Stimulator without synchronization.	+	—	—	+	+
17 T Diathermy Unit (Electromagnetic).	+	—	—	+	+
18 T Synchronized Respirator	+	+	+	+	+
19 T & P Blood Pump and Controls ..	+	+	+	+	+
20 P Myo-electric Control	+	—	+	+	+

Symbol:—

\+ Particular functional block exists. — Particular functional block does not exist.

D=Diagonostic. T=Therapetic. P=Prosthetic.

This table is taken from "Introduction to Medical Electronics" by S. K. Guha.

TABLE II—*cont.*

FUNCTIONAL BLOCKS IN INSTRUMENTS—*cont.*

Serial number, tyre and name.	*Functional Blocks.*				
	Comparator.	*Output Electrodes.*	*Output transducer.*	*Display and Recorder.*	*Others.*
	(7)	(8)	(9)	(10)	(11)
1 D Electrocardiograph	—	—	—	+	
2 D Electromyograph	—	—	—	+	
3 D Electroencephlograph	—	—	—	+	
4 D Strain Gage Pressure Monitor ..	+	—	—	+	Solenoid.
5 D Electronics Tonometer	+	—	+	+	
6 D Electromagnetic Flow meter ..	+	—	—	+	
7 D Spirometer	+	—	+	+	Serve System.
8 D Temperature Monitor	+	—	—	+	
9 D Thermograph	+	—	—	+	Scanner.
10 D PH Meter	—	—	—	+	
11 D Oxygen Saturation Meter ..	+	—	—	+	
12 D Oxygen Gas Analyser	+	—	—	+	Torque sensor.
13 D Katharometer	+	—	—	+	
14 D Plethysmograph	+	—	—	+	
15 D Audiometer	—	—	+	+	
16 D T & P Stimulator without synchronization.	—	+	—	—	
17 T Diathermy Unit (Electromagnetic).	—	+	—	—	
18 T Synchronized Respirator	+	—	+	+	Serveo System.
19 T & P Blood Pumps and Controls ..	+	—	+	+	Serveo System.
20 P Myo-electric Control	—	+	—	—	

Symbol :

\+ Particular functional block exists. — Particular functional block does not exist.

D = Diagonostic T = Therapetic. P Prosthetic.

This table is taken from " Introduction to Medical Electronics " by S. K. Guha.

CHAPTER XI.

1. *Cotton Mill Industry.*

1·1 The textile industry has developed on different and new lines in various parts of the country in the post independent period. In the First Plan, attention was paid mainly to the utilisation of existing capacity and meet any increase in demand that may arise. The improvement in consumption of cotton fabrics thus enabled an increase in the production of woven goods to 4,852 million metres from 3,727 million metres in 1951. During the same period, yarn production increased to 758 million kg. from 591 million kg. Thereafter, the emphasis has been mainly on the development of spinning capacity for meeting the needs of the decentralised sector with even severe restrictions on the installation of additional looms. This explains why yarn output has risen subsequently to 965 million kg. in 1970 while the output of woven goods has been rather static being 4,157 million metres. There has, of course, been a significant diversification of the pattern of production with changes in designs and the manufacture of blended fabrics in increasing volume.

1·2 There has also been a change in the pattern of consumption of fabrics with a growth of the industrial units for producing man-made fibres. The capacity for manufacturing rayon yarn and staple fibre has improved phenomenally while latterly greater emphasis has been made on the development of synthetic fibre units based on raw materials of petro-chemical origin. The availability of fabrics based on man-made fibre thus increased to 943 million metres in 1969 from 509 million metres in 1961. The trends in per capita consumption do not indicate any remarkable growth over a period perhaps due to the increasing use of man-made fibre fabrics which have a longer life. But with a growing population, total availability has substantially improved especially in the decentralised sector. The per capita availability of products turned out by the decentralised sector was higher at 6·40 metres per capita in 1969 against 5·30 metres in 1961. The share of man-made fabrics rose to 1·76 metres in the same period from 1·15 metres. The per capita availability of all fabrics was actually lower at 15·27 metres against 15·80 metres indicating a distinct shift in the content of consumption and their relative importance of the different sectors of textile industry.

1·3 In this process of new evolution the importance of the textile industry in the Southern Region has grown considerably. In 1951 the installed spindles were 23·09 lakhs in respect of 107 spinning and composite mills. By 1961, the capacity rose to 40·84 lakhs and the number of mills to 183. Ten years later, the capacity was much higher at 58·36 lakh spindles in respect of 295 mills. It is note-worthy that the increase in spinning capacity was mainly on account of the spinning units. Tamil Nadu accounted for the greater share of increase in capacity, there being 207 mills in April, 1971. With 41·81 lakh spindles and 9,124 looms in the composite sector, the State has thus 23 per cent of the spindles installed in the country though only 4 per cent of the looms in operation. Even composite mills barring a few exceptions, produce much more yarn than their weaving departments can use. The result is practically every mill in Tamil Nadu sells yarn to customers. There has been latterly an attempt to increase weaving capacity by installing automatic looms

but the preponderance of spinning capacity is bound to be in evidence over the years as fresh emphasis will necessarily be on mechanisation of handlooms and the erection of powerlooms.

1·4 As regards the growth in consumption in the perspective plan period it is estimated that by 1984 the per capita consumption of cloth will be 18 metres and 85 per cent of it will be manufactured from cotton fibre and 15 per cent by man-made fibres. This will give an availability of 15·30 metres of cotton cloth and 2·70 metres of man-made fibre fabrics. The higher level of consumption can be safely expected to be achieved inspite of the fact that no clear trends emerged in four Plan periods. There will, however be a higher standard of living among the weaker sections of the society and the disparities on consumption standard between the rural and urban population will also tend to disappear.

2. *Past Plan Progress.*

2·1 The First Five-Year Plan did not set any targets for expansion of production in Textile Industry, but laid emphasis only on the equitable distribution of new units for a balanced development in all regions of the country.

2·2 The second plan set the targets for cloth production at 7,650 million metres (8,500 million yards). Of this, 4,950 million metres (5,500 million yards) were allotted to the mill sector and the rest to the decentralised sector. Target for yarn production was set at about 900 million kilograms (1,950 million pounds). To achieve this output 1·57 million more spindles were planned to be installed.

2·3 The Third Plan estimated the domestic demand for cloth at about 8,500 million metres including a target for export of 780 million metres. The mill sector and decentralised sector were to produce 5,300 million metres and 3,200 million metres. Yarn production was planned to be 1,021 million kg. About 3,700,000 additional spindles and 30,000 additional looms were planned to be installed. As much as 50 per cent of increase in the number of spindles was allotted on a State-wise basis.

2·4 The Fourth Plan set targets of 5,100 million metres and 4,400 million metres for mill sector and decentralised sector respectively.

3. *Cotton Production and Consumption*.—Even in 1951 when the number of spindles installed was less than 11,000,000, cotton production in the country was not sufficient to meet the requirements of the cotton textile industry, although domestic production of cotton has increased over these twenty years, and has even met a part of the requirements of the Industry.

4. *Development of the Industry in Tamil Nadu.*—As bulk of the industry of the Southern region is located in Tamil Nadu, development in the region can be taken to represent the growth in the State. It will be noticed that while the number of spindles installed more than doubled, number of looms, installed increased by about 33 per cent. Tamil Nadu has about 24 per cent of number of spindles installed in India, though it has only about 4 per cent of the number of looms installed. Even composite mills, barring a few exceptions, produce much more yarn than their weaving departments can use.

5. *Future Development.*

5.1. Our basic assumption is that by 1984 the per capita consumption of cloth will be 18 metres, 85 per cent of which would be manufactured from cotton fibres and 15 per cent

from man-made fibres. In other words, per capita consumption would be 15·30 metres of cotton cloth and 2·7 metres of cloth manufactured from synthetic fibres.

5.2. These assumptions appear on first sight to be unrealistically high. Dr. Mehtha had assumed per capita consumption of cotton cloth of 14·3 metres or on a more optimistic view 14·5 metres. Working Group for Textile Machinery for the Fourth Plan had assumed an average consumption of 14·3 metres for the Fourth Plan. On the other hand the NCAER had projected a demand even in 1970–71 of 18·63 metres (including cloth from cotton and synthetic fibres) for developmental areas. Against these, there is the physical reality that in 1964 actual consumption of cotton cloth was 15·10 metres per capita. Based on the National Sample Survey expenditure elasticities of demand and the Third Plan target of the rate of growth in per capita income or on the perspective Planning Divisions minimum rate of growth in per capita income, the per capita consumption comes to 19·7 metres and 21·6 metres respectively.

5·3. Per capita consumption of cloth made from synthetic fibre is 1·76 metres. This is the position when a large proportion of the population (62·9 per cent) has not heard of synthetic fibres. This situation will change when developmental activities cover the entire country and the differences between patterns of consumption between urban and rural areas disappear.

6. *Demand Projections.*

6·1 By 1984, cloth consumption per year in Tamil Nadu will be about 959 million metres. Existing production from the Mill Sector and decentralised sector is 743 million metres. Therefore, provision for increase in cloth production of about 216 million metres has to be made. For this purpose, an additional 8,640 power or automatic looms will be required.

6·2 As there are hardly any independent finishing units in the State now, finishing facilities for the current production as well as future increase in production will have to be made ; 40 finishing units, each with a capacity to finish about 25,000,000 metres of cloth will be required.

6.3 While the increase in the output of cloth as indicated above will take care of the needs of the State, arrangements will have to be made for securing a larger value for the output of the spinning mills as sizeable quantities of yarn are being exported to other States. This will call for the installation of larger number of automatic looms and powerlooms for converting a good portion of the yarn now being sent to other States though the handloom and the powerloom weavers in areas outside the State will have to be provided their requirements on the present scale. In fact, the spinning capacity will have to be increased as aggregate consumption of fabrics by 1983–84 would have increased nearly to 13,500 million metres against a little over 7,500 million metres in 1971–72. Tamil Nadu was having 24 per cent of the spinning capacity in all-India ; every effort should be made to maintain this preeminent position. There may of course be competing demands for installing new capacity from other States and only with intelligent planning and some effort a share of atleast 20 per cent of the expanded spinning capacity can be ensured for Tamil Nadu in 1983–84. As there will have to be increase in the spindlage for the whole country by atleast 75 per cent in the next twelve years allowing for technological

improvements, additionally 13.5 million spindles will have to be installed taking the tota to nearly to 3.2 million spindles at the end of the Sixth Plan period. About one fifth of this capacity is to be located in Tamil Nadu and the spindlage will have to be increased to 6.4 million from the present level of 4.1 million. There will thus have to be a growth in the capacity by 50 per cent in the 12 year period under reference. One half of the additional capacity can be brought into being through expansion schemes while about 30 to 40 new units may have to be started in Tamil Nadu for achieving the balance of capacity of 1.3 million spindles. The Textile Industry will therefore play an even more important role in the coming years.

6.4 Cotton requirements would naturally increase to over 15 lac bales of 180 kg. each for feeding a larger capacity. As there is a deficit of 7 lac bales at present and it is desirable to increase availability of the natural fibre within the region every attempt should be made to double the production and reduce the deficit to 3 lac bales. There should be more than proportionate increase in the consumption of polyester fibre and filament yarn and their availability will have to be increased to 10,000 tonnes and 6,000 tonnes respectively in 1984. Annual requirements in 1984 of other man-made fibres will be 5,000 tonnes of fibre and 3,000 tonnes of filament yarn.

7. *Cost of Expanding Production.*

7·1. Installation of looms will cost approximately Rs. 4·5 crores. Finishing plants will cost about Rs. 40 crores. As prices increase at the rate of 7 per cent per year, and as it would take about 5 years at least to complete this expansion, the total cost might amount to Rs. 60 crores in all.

7.2 The additional spinning capacity will require an outlay of nearly Rs. 75 crores allowing for a modest increase in prices. The spinning, weaving and finishing departments will thus involve fresh expenditure of Rs. 175 crores apart from any outlay that may have to take place for modernising and rehabilitating existing machinery. This itself may call for fresh capital expenditure of about Rs. 60 crores taking the total of all investment in this major industry to nearly Rs. 235 crores.

8. *Objective.*

8.1 Objective of the textile policy of the State of Tamil Nadu should ensure that the existing spinning capacity in the State is put to full use. However, the constraints which, prevented the full development of the industry in the past may continue to inhibit its future growth.

8.2 Consumer resistance limits the rate of increase in the production of cloth and this arises from the inability or unwillingness of the decentralised sector to cater to other than traditional markets.

8.3 Paucity of facilities to process cloth in the State places both the mill and the decentralised sector in the State at a disadvantage vis-a-vis their counterparts in other States, particularly, Maharashtra.

8.4 Cotton production in Tamil Nadu is not adequate to meet the requirements of the mills in the State.

8.5 Most mills in the State do not have funds sufficient either to modernise or even for profitable manufacturing.

9. The Task Force recommends :

9.1 Urgent steps to be taken to find ready markets for yarn produced in the State. An immediate step is to expedite the installation of about 10,500 powerlooms which are yet to be installed out of the 12,500 powerlooms allotted to the State by Ashok Mehta Committee. As a first step, Weavers' Co-operative Societies may be asked to take advantage of this. However, if they do not come forward within three months, these should be allotted on the basis of priority applications. The development of backward areas by allotment of powerlooms may be considered for adoption. It is necessary to prevail upon the Government of the States of Mysore, Andhra, Kerala and Pondicherry to install the powerlooms allotted to their States by the Ashok Mehta Committee. If the other State Governments in the Southern region are not keen on expediting the installation of powerlooms in their States, those allotted to them may be installed in Tamil Nadu.

9.2 Measures may be taken for the installation of processing units. From the date of ordering, it might take three years for the plants to go into production and hence extreme urgency is required. It may be necessary to think in terms of establishing at least 20 processing units in the private sector at a cost of Rs. one crore each. Besides, six Weaving-*cum*-Finishing Units at Coimbatore, Madurai, Tirunelveli, Trichy, North Arcot, and Krishnagiri with 1,000 looms for a finishing plant may be set up in the joint sector on a total outlay of Rs. 24 crores (Rs. 4 crores per unit).

9.3 A Committee may be set up to examine the needs of modernisation in the cases of mills which are unable to modernise with their own funds as well as to suggest the conditions under which Government help in modernisation may be given.

9.4.1 The Government to be requested to ask the TIIC and the SIPCOT to subscribe to the share capital of Textile Mills and make this facility available to them for enabling them to convert them into Public Limited Companies so that they may become financillay viable units.

9.4.2 It may be necessary to explore the possibility of merging of sick units with profitable industries in the State with Textile or otherwise and the necessary financial assistance for renovation or modernisation to be provided by the TIIC and the SIPCOT.

9.5 Adequate funds will have to be allotted for research in the development of cotton cultivation in the State and early measures should be taken to ensure that all the cotton needed by the Industry in Tamil Nadu are raised in the State itself. It would be far cheaper to spend money on increasing cotton cultivation rather than spend it, later, on the taking over of sick textile mills. To achieve this, the crop pattern in Thanjavur District has to be diversified with a view to give a new dent on cotton cultivation.

9.6 Efforts will have to be taken for stimulating cloth consumption throughout India. To this end, it may be necessary—

9.6.1 to set up institutes for the development of new designs in all important finishing centres ;

9.6.2 to establish Research Institutes in important centres of handloom weaving;

9.6.3 to educate the decentralised sector to procure fabrics which would be in demand by all sectors of the public not merely by the traditional peoples ;

9.6.4 (i) to make available to the decentralised sector yarn blended from cotton and man-made fibres ;

(ii) to arrange to give Easy Care Finish to cloth produced in the decentralised sector.

TABLE I.

GROWTH OF TEXTILE INDUSTRY IN SOUTH INDIA.

As on 1st January of the year.

Year.	*Number of mills.*			*Spindles installed*			*Looms installed in composite Mills.*
	Spinning.	*Composite.*	*Total.*	*In Spinning Mills.*	*In Composite Mills.*	*Total.*	
				(IN LAKHS.)			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1951	..	..	107	..	..	23·09	15,357
1956	97	14	111	13·85	15·77	29·62	17,315
1961	138	45	183	23·94	16·90	40·84	16,724
1966	203	47	250	30·94	19·09	50·03	19,470
As on 31st December 1970 ..	248	47	295	39·26	19·01	58·36	20,496
Tamil Nadu only as on 1st April 1971.	183	24	207	29·18	12·62	41·81	9,124

Source—For all but last entry : " Indian Cotton Textile Industry 1970 " issued by Southern India Mill Owners Association ".

Last entry : Indian Textile Bulletin—June 1971.

TABLE II.

PROGRESS OF INSTALLATION OF SPINDLES AND LOOMS SINCE THE COMMENCEMENT OF THIRD FIVE-YEAR PLAN.

	Licensed installed capacity prior to the three plans (Positions as on 1st April 1951).	*Licensed capacity as on 1st April 1961.*	*Additional capacity licensed (alive) during the 3rd Plan period.*	*Capacity permitted against marginal expansion* (alive).*	*Licensed capacity as on 31st December 1970 (i.e. 2+3).*	*Actual installed capacity as on 1st April 1961.*	*Additional capacity installed during 1st April 1961 to 31st December 1970 (against marginal expansion and other licences issued till 31st December 1970).*	*Actual installed capacity as on 31st December 1970 (Provisional) (i.e. 6+7.)*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Spindles (in Millions).	11·24	14·30	3·89	0·74	18·19	13·98	3·82	17·80
Looms (in Lakhs) ..	1·95	1·99	0·05	0·09	2·04	1·99	0·10	2·09

* Permission against marginal expansion have not been included in licensed capacity shown at column No. 3.

Source : Indian Cotton Mills and Federation Journal—March 1971.

TABLE III (*a*).

YARN AND CLOTH PRODUCTION.

Comparison of Southern Region's Production with all India Production.

Year.	All India.		Southern Region.		
	Yarn.	Cloth.	Yarn.	Per cent of All India production.	Cloth.	Per cent of All India production
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1951	591	3,727	112	18·7	222	5·9
1956	758	4,852	166	21·9	294	6·0
1961	862	4,701	220	25·5	304	6·4
1966	901	4,239	230	25·5	313	7·3
1970	965	4,157	292	30·2	354	8·5

Unit—

Yarn—Million Kg.

Cloth—Million Metres.

Year.	Southern Region's Share of all India.	
	Installed Spindles	Installed Looms.
(1)	(2)	(3)
	(PER CENT.)	
1951	20·9	7·7
1970	32·6	9·8

Source : Indian Cotton Textile Industry 1970, Published by SIMA, Coimbatore.

TABLE III (*b*).

STATEMENT SHOWING FIGURES OF INSTALLED CAPACITY, NUMBER OF MILLS AND CLOTH PRODUCTION FOR THE YEAR 1970 FOR THE SOUTHERN STATES.

State.	Number of mills.	Looms installed.	Production 000 metres.	
			December 1970.	Year 1970.
(1)	(2)	(3)	(4)	(5)
Andhra Pradesh	3	1,246	3,225	34,109
Kerala	5	1,118	1,595	18,714
Mysore	12	6,301	7,072	81,691
Tamil Nadu	24	9,118	3,036	1,66,925
Pondicherry	3	2,713	5,063	52,707
Total ..	47	20,496	19,991	3,53,606

TABLE IV.

PER CAPITA AVAILABILITY OF CLOTH.

Period.	Estimated mid-year population (in millions).	Availability for home consumption (in million metres).			
		Mill sector.	Decentralised sector.	Man-made fibre fabrics.	Total.
(1)	(2)	(3)	(4)	(5)	(6)
		A	B	C	A+B+C
1961	442·74	4,180	2,347	509	7,036
1962	453·41	4,096	2,386	527	7,009
1963	464·34	3,933	2,847	574	7,354
1964	475·53	4,151	3,028	767	7,946
1965	486·99	4,080	3,016	833	7,929
1966	498·86	3,814	3,060	812	7,686
1967	511·30	3,686	3,146	879	7,711
1968	524·05	7,400	..	976	8,376
1969*	537·12	7,259	..	943	8,202

Period.	Per capita availability (in metres).				
	Mill sector.	Decentralised sector.	Man-made fibre-fabrics.	Total cotton fabrics.	Grand total.
	D	E	F	D+E	D+E+F
	(7)	(8)	(9)	(10)	(11)
1961	9·44	5·30	1·15	14·74	15·89
1962	9·03	5·26	1·16	14·29	15·45
1963	8·47	6·13	1·24	14·60	15·84
1964	8·73	6·37	1·61	15·10	16·71
1965	8·38	6·19	1·71	14·57	16·28
1966	7·65	6·13	1·63	13·78	15·41
1967	7·21	6·16	1·72	13·37	15·09
1968	14·12	..	1·86	14·12	15·98
1969*	13·51	..	1·76	13·51	15·27

* Provisional.

Source: Except for 1968–69=Future Prospects of Cotton Spinning Industry—SITRA Publication.

For 1968–69=Indian Textile Bulletin.

587C—59—14A

TABLE V.

Plan Targets and Achievements All India.

Machinery Installation, Yarn and Cloth Production.

Year.	Yarn Production.		Cloth Production.			
			Mill Sector.		Decentralised Sector.	
	Target.	Actual.	Target.	Actual.	Target.	Actual.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1951 Before Plan	..	591	..	3,727	..	1,013
End of 1st Plan 1956	N.A.	758	N.A.	4,852	N.A.	1,663
End of 2nd Plan 1961	900	862	4,950	4,701	2,700	2,372
End of 3rd Plan 1966	1,021	901	5,300	4,239	3,200	3,097
End of 1970	1,150*	965	5,100*	4,157	4,400*	3,692

Year.	Production Capacity.	
	Number of spindles installed.	Number of looms installed.
	Target.	Actual.	Target.	Actual.
	(8)	(9)	(10)	(11)
1951 Before Plan	..	11·00	..	195
End of 1st Plan 1956	11·29	12·07	196	..
End of 2nd Plan 1961	14·30	13·70	199	199
End of 3rd Plan 1966	18·00	16·12	225	208
End of 1970	N.A.	17·87@	N.A.	209@

@ As at commencement of 1971.

*For 1973–74.

Machinery installed is at the commencement of the year.

N.A.—Not available.

Source :—Indian Textile Bulletin, Kothari's Economic Guide and Investors Handbook of India 1969–70.
"Future Prospects of Cotton Spinning Industry" SITRA Publication.

Units—

Yarn = In Million Kg.
Cloth = In Million Metres.
Spindles = In Million Nos.
Looms = In thousand Nos.

TABLE VI.

Cotton Production and Consumption.

(In lakhs of bales—180 kg. a bale.)

Cotton year ending 31st August.	Production.		Year.	Consumption.		Total.
	Target.	Actual.		Indian.	Foreign.	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1951–52	N.A.	37·60	1951	27·40	11·06	38·46
1956–57	N.A.	51·20	1956	43·72	6·19	49·91
1961–62	N.A.	49·70	1961	45·16	10·46	55·62
1966–67	70	56·00	1966	53·01	5·64	58·65
1970	N.A.	N.A.	1970	56·27	7·62	63·89
Fourth Plan	85					

N.A.=Not available.

Source : Column 1 & 3=Kothari's Economic Guide and Investors.
Column 4, 5, 6 & 7=Indian Textile Bulletin.

TABLE VII.

COTTON PRODUCTION AND CONSUMPTION IN TAMIL NADU.

(In lakhs of bales of 180 kg.)

Year.	Production.	Year.	Consumption.		
			Indian.	Foreign.	Total.
1963–64	N.A.	1964	9·34	1·23	10·57
1965–66	4·35	1965	9·28	1·50	10·78
1966–67	4·47	1966	8·86	1·09	9·95
1967–68	3·69	1967	8·82	1·37	10·19
1968–69	2·55	1968	9·28	1·52	10·80
1969–70	3·97	1969	10·43	1·45	11·88

N.A. = Not Available.

Source: Indian Cotton Textile Industry 1970—Published by Sima, Coimbatore.

MILL CLOSURES.*

Year.	Mill closed.	
	Number.	Percent.
	(1)	(2)	(3)
1961	22	4·6
1962	16	3·3
1963	13	2·6
1964	12	2·4
1965	24	4·3
1966	32	5·4
1967	31	5·0
1968	50	7·7
1970	53	8·1
End of June 1971	65	9·7

*Excludes mills scrapped and proposed to be scrapped.

Source: Future Prospects of Cotton Spinning Industry SITRA Publication.

TABLE VIII.

REVENUE REALISED BY GOVERNMENT FROM EXCISE DUTY ON CLOTH AND YARN.

(In Crores of rupees.)

Year.	On cloth.		On yarn.	Grand total.
	Excise duty.*	Additional duties.		
	(1)	(2)	(3)	(4)	(5)
1950–51	9·26	..	..	9·26
1951–52	16·36	..	..	16·36
1952–53	13·46	..	..	13·46
1953–54	21·67	..	..	21·67
1954–55	27·59	..	..	27·59

TABLE VIII—*conl.*

REVENUE REALISED BY GOVERNMENT FROM EXCISE DUTY ON CLOTH AND YARN
(In Crores of rupees.)

Year.	On cloth.		On yarn.	Grand total.
	Excise duty.*	Additional duties.		
(1)	(2)	(3)	(4)	(5)
1955–56	28·18	..	..	28·18
1956–57	51·86	..	..	51·86
1957–58	64·60	6·39	..	70·99
1958–59	57·40	21·19	..	78·59
1959–60	46·75	19·96	..	66·71
1960–61	45·94	20·33	0·13	66·40
1961–62	47·51	19·46	4·98	71·95
1962–63	58·37	20·34	8·38	87·09
1963–64	57·36	20·78	12·67	90·81
1964–65	55·66	20·74	25·13	101·53
1965–66	50·49	20·52	25·63	96·44
1966–67	56·66	19·81	30·87	107·34
1967–68	51·12	19·55	37·21	107·98
1968–69	59·85	20·31	39·05	119·21
1969–70	57·49	20·68	34·07	112·24
1970–71 (Revised Budget)	57·88	24·18	34·50	116·56

* Figures of Proceeding duty and handloom cess are included in basic duty.

† Including yarn compounded duty.

Source.—Indian Cotton Textile Industry 1970—SIMA Publication.

TABLE IX.

POWERLOOMS.

Statement showing number of looms allotted and number of looms for which permits issued.

States.	Total allotment.	Number of looms for which permits have issued.
(1)	(2)	(3)
Madras	12,500	2,059
Andhra	12,400	2,891
Mysore	4,300	2,136
Kerala	3,900	33
Pondicherry	500	427

Source.—Southern Region Office of the Textile Commissioner.

TABLE X.

EXTRACT FROM WORKING GROUP REPORT.

Demand projections for Cloth and Machinery—Tamil Nadu.

Projection of population 1984	5,32,69,300.
Annual per capita requirement of cloth	18 M.
Annual requirement of cloth	959 million metres.
Existing production of cloth—	
Mill Sector	167 M. Metres.
Decentralised sector	576 M. Metres.
	743 Do.
Balance cloth to be produced ;	959—743 = 216 M. Metres.
Number of looms required to produce this amount of cloth production per loom per year 25,000 M.	$\frac{=216,000,000}{25,000}$ =8,640.

Number of finishing plants required:

One for every 25,000,000 M. of cloth production per year—

Anticipated production	959 or 1,000 M. Metres.
Number of units required	$\frac{1,000}{25}$ 40 units.

Cost estimates :

Number of looms required	8,640.
Cost per loom	Rs. 3,000.
8640 × 3000 = 2,59,20,000	= Rs. 26,000,000
Buildings, etc. 8640 × 2000	17,280,000
Number of finishing units required	40.
Cost per finishing unit—	
Machinery	Rs. 80 lacs.
Ancillary	Rs. 20 lacs.
Total ..	Rs. 1 crore.
Total finishing cost	Rs. 40 crores.

CHAPTER XII.

Handloom Industry.

1. *Historical Background.*

1.1. It is well known that the handloom industry had attained a very high degree of perfection in India centuries before machine was invented to produce cloth. As the largest cottage industry in India, it occupies a place of prominence in the general economy of the country. Nearly one-third of the total requirement of cloth is provided by this sector.

1.2 Total number of handlooms registered all over India is 20,59,754 out of which the Southern States account for 11,32,736, or 55 per cent of the total as detailed below :—

Serial number.	*States.*	*Number of looms.*
1	Andhra Pradesh	4,01,712
2	Tamil Nadu	5,16,086
3	Mysore	1,02,355
4	Kerala	1,09,185
5	Pondicherry	3,398
	Total ..	11,32,736

Handloom production average 3 yards per day or 2·7 metres per loom per day. The potential production per day would amount to 3,059,000 meters.

1.3. This industry occupies an important place in the economy of Tamil Nadu with an annual production of handloom cloth valued at Rs. 48 crores. Being a decentralised industry based on manual labour, it has always been facing difficulties relating to raw materials, finance and competition from the textile mills and powerlooms. The Government of Tamil Nadu have been taking keen interest in the development of the industry and in the promotion of the socio-economic conditions of the handloom weavers engaged in it. The expenditure of the Government by way of loans and subsidies under the Five-Year Plans are furnished below :—

Plan period.	*Expenditure.* (RUPEES IN LAKHS.)
Second Five-Year Plan 1956–57 to 1960–61 ..	713·00
Third Five-Year Plan 1961–62 to 1965–66 ..	750·30
1966–67	183·45
1967–68	118·00
1968–69	130·69
1969–70	145·00
1970–71	197·06
1971–72 (Proposed)	254·34

The handloom industry has made substantial progress as a result of the implementation of the Five-Year Plan Schemes. To assess the position of the handloom industry and to formulate proposals for the Fourth Plan, the Government of India set up a working group in 1964. A working group was also constituted by the Tamil Nadu Government which submitted its report reviewing the achievements made by the Handloom Industry and formulating the schemes to be taken up during the Fourth Plan in this State. Based on the recommendations of the State Working Group, an outlay of Rs. 10·60 crores was proposed for the Fourth Plan for the development of the Handloom Industry.

2. *Schemes and Pattern of Assistance.*

2.1 *Share Capital Assistance.* The members were provided with loan assistance as incentive to acquire membership of the co-operatives.

2.2 *Research and Technique.*—Under this scheme loans and grants at the rate of 25 per cent and 75 per cent respectively are given to the members of weavers co-operative societies for the purchase of appliances in order to improve the quality and pattern of cloth produced and also to reduce the cost of production.

2.3 *Rebate Scheme.*—With a view to encouraging sales to the public, rebate subsidy, at 5 paise and 3 paise in the rupee for retail and wholesale rates respectively during normal periods and 10 paise in the rupee during special periods like festivals, is given.

2·4 *Marketing and Publicity.*—Under this scheme financial assistance is given to the Tamil Nadu Handloom Weavers Co-operative Society and Primary Weavers Co-operative Societies for establishing new sales depots and emporia and for undertaking publicity measures.

2.5 *Industrial Weavers Co-operative Societies.*—These Co-operative Societies are given financial assistance for the purchase of looms and accessories, share capital advance to members, construction of worksheds, etc.

2.6 *Silk and Art Silk Societies.*—Silk societies are given special financial assistance towards share capital, purchase of appliances, furniture, payment of rent and for employment of staff. Up to the year 1967–68, Working Capital loans to Silk Weavers Co-operative Societies were given by the Government under the Handloom Development Schemes. From 1st April 1968 onwards the Reserve Bank of India has taken over the function of financing under section 17 (2) (*bb*) of the Reserve Bank of India Act and the funds are routed through the Co-operative financing banks in the concerned districts.

2.7 *Subsidy for Managerial Staff.*—Under this scheme assistance is given to the financially weak societies in the shape of subsidy towards the cost of managerial staff on a sliding scale for four years, the maximum for the first year being Rs. 1,000 per society, subject to the conditions that there should be 100 looms in the society of which 50 should have worked and that the society should have sustained net loss according to its balance sheet.

2·8 *State participation in the Share Capital of Primary Weavers Co-operative Societies.*—State participation in the share capital of the primary weavers co-operative society was first introduced in 1967–68 based on the recommendations of the Standing Committee of the All India Handloom Board. The Reserve Bank of India which is providing working capital loan to weavers co-operative society, has prescribed certain standards, according to one of which the society is required to show a margin of 10 per cent of the borrowings. In order to help the marginal societies in this regard, the Government are strengthening the share capital resources by subscribing towards their share capital.

2·9 *Welfare Schemes.*—While implementing various schemes for the development of handloom industry the Government have also taken special care to promote the socio-economic conditions of the weavers by taking up welfare schemes such as (i) Housing, (ii) Contributory Thrift Fund Scheme, (iii) Collection of Statistics, (iv) Prize Award Schemes, (v) Organisational expenses on Plan Schemes and (vi) Training.

3. *Production and Sales.*

3·1 The handloom industry is producing fabrics of different varieties such as saries, dhoties, towels, bed-sheets, furnishing fabrics, shirting, lunghies, etc., according to the requirements of the people in this State and also in other States. It produces varieties of fabrics for export to other countries also. The phenominal progress made in the matter of production and sale of handloom cloth in the co-operative sector in the plan periods is indicated below :—

Plan period.	*Production in Million yards.*	*Sales in crores of rupees.*
(1)	(2)	(3)
First Plan (31st March 1956)	73·34	5·91
Second Plan (31st March 1961)	97·89	9·84
Third Plan (31st March 1966)	115·00	12·50
1966–67	80·00	10·50
1967–68	83·94	10·74
1968–69	77·72	11·01
1969–70	67·74	10·85
1970–71	67·27	15·00

The production in the co-operative sector at the end of the First Plan period was 73·74 million yards, valued at about Rs. 6 crores. As a result of the large financial assistance provided to the handloom industry by implementing various schemes of development, the production rose to 115 million yards in 1965–66. Since then, the production in yardage is in the downward trend owing to the general slump in cotton textile industry, the changes in consumers preferences in favour of fabrics woven with synthetic fibres such as nylon terelyne, etc., and also shift in the pattern of production to finer counts. The revision of the basis of Reserve Bank of India finance to weavers co-operative societies and sales and the onditions governing the revised basis have also affected the working of a number o

societies and their production. The State Government have been prevailing upon the Reserve Bank of India to relax the standards and the latter has permitted some marginal relaxation. It is time that the Weavers Co-operative Societies also take note of the fact that they should take to business like methods and fall in line with general banking principles. Their major difficulty is that of slow turnover which involves larger working capital. Re-orientation of their production is absolutely necessary for speeding up and increasing their turnover. As the Co-operative Sector covers only 30 per cent of the Handloom Weavers it can be roughly estimated that total production of Handloom products in 1971–72 was around 380 million meters having a value of Rs. 48 crores as indicated earlier.

3.2 The Government have been rendering special assistance to the societies in the disposal of their stocks. During the periods of stagnation of goods with primary weavers co-operative societies finance is provided to the Tamil Nadu Handloom Weavers Co-operative Society for intensive programmes so that the members of the societies may get continuous employment.

3.3 In order to promote the sale of handloom cloth, the Government sponsored a special scheme during 1968–69 for the sanction of advances to Government servants for the purchase of handloom cloth from the selling units of the State Handloom Weavers Co-operative Society. This has also been extended to the employees of local bodies and Panchayat Unions. This measure has helped the Tamil Nadu Handloom Weavers Co-operative Society to increase its sales by Rs. 48 lakhs during Deepavali season in 1969 and Rs. 71·36 lakhs in 1970.

4. *Marketing.*

4.1 Marketing is the principal problem of the handloom industry. It has to face stiff competition from the well organised mechanised mill sector, powerlooms and man-made fibres. A number of plan schemes have therefore been drawn up for carrying on propaganda and publicity to popularise the handloom goods and to organise marketing on an extensive scale. The sales promotion schemes may be classified under four broad categories :—

(*a*) Measures for Publicity and propaganda ;

(*b*) Establishment of selling units.

(*c*) Readymade garments.

(*d*) Exports and Rebate.

5. *Handlooms outside Co-operatives.*

5.1 Assistance under the plan scheme for the handloom industry is confined entirely to the co-operative sector. Weavers outside the co-operative fold get only marginal and indirect benefits from such measures as publicity and propaganda and regulated distribution of yarn and other raw materials. Even now, nearly 70 per cent of handloom in the State are owned by the Weavers outside the co-operative sector. Almost the entire export production is in the hands of weavers outside the co-operatives. It has, therefore, been felt that in the interests of a balanced growth of the handloom industry, the weavers outside the co-operative fold should also receive assistance. With this objective the

Government have sponsored the establishment of the Madras Handloom Finance Corporation, Limited, to provide financial assistance to the Handlooms and ancilliary industries mainly outside the co-operative sector. The Corporation was registered as a public Limited Company, and a non-banking financial institution in September 1964, with a paid up share capital of Rs. 50 lakhs. It commenced its loan business in April 1965. So far Rs. 772·13 lakhs have been disbursed as loan to the members of the Cor poration. The State Government have taken shares in the Corporation to the extent of Rs. 25 lakhs. The State Bank of India has provided revolving cash credit accommodation of Rs. 90 lakhs to the Corporation on Government Guarantee. On an average the Corporation sanctions loans to the extent of Rs. 140·00 lakhs every year.

6. *Distribution of raw materials to the Handloom Industry.*

6.1 *Cotton Yarn*—

6.1.1 The optimum consumption of the handloom industry in the State is about 20,000 bales per month. The powerlooms, hoisery and other ancillary industries require about 9,000 bales per month. Considering the total production by all the mills, Tamil Nadu is always surplus in the production of cotton yarn. The overall position reveals that there cannot be scarcity in the availability of cotton yarn within the State.

6.1.2 But, the prices of yarn depend upon so many factors, viz., market trend and cotton price. It is singificant to point out that the total production of cotton falls too short of the requirements for the same, especially in Tamil Nadu. So the prices of yarn tends to increase as a result of the increase in the prices of cotton.

6.1.3 With a view to relieve those engaged in Handloom Industry, the Government of India have introduced the Special Cotton Yarn pool scheme for the distribution of cotton yarn of 10s, 20s, 30s and 40s count to the decentralised sector (Handlooms, Powerloom and Hoisery Industries). The scheme is in force from February 1971 and has been extended up to August 1972. The prices of cotton yarn have been fixed by the Textile Commissioner, Bombay. The scheme is under implementation.

6.2 *Art Silk*—

6.2.1 The allotment of indigenous art silk yarn is now made by the Tamil Nadu Regional Committee at Salem at the Central Committee of Spinners and Weavers who distribute Viscose Filament Yarn to the Association of Handloom goods manufacturers. The allotment of yarn is made at reasonable prices in accordance with the terms of a voluntary agreement arrived at between the Spinners and Weavers.

6.3 *Imported Art Silk Yarn.*—The import of art silk yarn by the actual users as well as by the established importers has not been permitted by the Government of India. But the Government of India entrusted the work of importing art silk yarn to the State Trading Corporation of India. During the year, 1969, the State Trading Corporation alloted 172 tonnes of cuprammonium art silk for distribution to Handloom Associations and co-operative societies in the State. Out of the above, only a quantity of 8 tonnes were lifted by the Associations and the co-operative societies as the price was on the higher ide. During the year, 1970, no allotment was made.

6.4 *Raw Silk.*—The announcement of the Government of India regarding the issue of permit for import of raw silk has an effect on the silk yarn market and this is one of the reasons for the unsteady price of raw silk. The Central Silk Board as a short term measure has already initiated action on (1) canalisation of imports (ii) setting up of a raw material bank and (iii) banning of new installation or conversion of powerlooms.

6.5 *Zari.*—The silk handloom weavers in Tamil Nadu have been buying gold zari to the extent of more than a crore of rupees every year from Surat. With a view to make gold zari available at reasonable prices, the Government have sanctioned the establishment of a zari manufacturing unit at Kancheepuram.

6.6 *Dyes and Chemicals.*—The import of dyes was not permitted under the actual users licence during the licensing period 1969–70. None of the chemicals normally used by the Handloom industry is open for import by the actual users during the current licensing period. The exporters of Handloom fabrics are allowed to import the permissible items of dyes and chemicals up to 5 per cent of the value of their exports.

6.7 *Hydrosulphite of Soda.*—To meet the acute shortage of hydrosulphate of soda arrangements were made with Travancore-Cochin Chemicals, Alwaye and J.K. Chemicals for regular allotment to the Director of Handlooms and Textiles who in turn distributed it among the Handloom Associations and Co-operative Societies. The allotment made by the State Trading Corporation from the imported stocks was also distributed among the Associations and the co-operatives.

7. *Co-operative Spinning Mills.*

7.1 With the twin objective of supplying good quality yarn at reasonable prices to the wevears co-operative societies and stabilising the market prices of yarn, the Governmen decided to encourage the establishment of spinning mills in the Co-operative Sector. Four co-operative spinning mills were started at the end of the second plan period, one each at Pettai and Nazerath in the Tirunelveli district, Srivilliputhur and at Salem. The establishment of nine more co-operative spinning mills were taken up as part of the Third Plan Schemes under a new project. Of these nine mills, eight units have been set up, at Dharapuram in Coimbatore district, Kancheepuram, Karur, Mayuram, Melur in Madura district, Nagercoil, Tindivanam and Vellore each with 12,000 spindles. The nineth unit with 12,000 spindles has been established as the second unit of the South India Co-operative Spinning Mills at Pettai.

7.2 There are 12 Co-operative Spinning Mills in the State one in each District except Madras, Nilgiris, and Dharmapuri with a installed capacity of 1,82,808 spindles producing cotton yarn of various counts from 20s to 100s. The working results of these spinning mills showed a further improvement during 1971 when compared to the previous years as shown below :—

	1968.	1969.	1970.
Prduction (in lakhs kg.)	88·25	105·70	118·10
Sales Turnover (Rupees in lakhs) ..	743·06	899·36	1,146·17

The total investments made by the Government of Tamil Nadu in the share capital of these mills amounted to Rs. 184·12 lakhs. They have granted straight loans to the Co-operative Spinning mills to the extent of Rs. 52·07 lakhs to enable them to tide over their financial difficulties. The Government have also extended guarantee in favour of spinning mills for the repayment of the term loans and working capital loans taken by them from the Institutional financing agencies to the tune of Rs. 618·98 lakhs.

7.3 At the end of the year 1970, the Co-operative Spinning Mills, particularly those producing coarse counts of yarn, experienced some difficulties in getting their requirements of local and up country cotton. To tide over the difficulties of the mills, the Government took various steps to make available adequate quantities of cotton to the mills by getting allotments of additional quota of foreign cotton. The Mills were also to make advantageous purchases of up-country cotton through the good offices of the Maharashtra State Co-operative Marketing Federation, Bombay, etc. As a result of these measures, the mills managed to continue their production programme without any interruption.

7.4 Most of the Co-operative Spinning Mills have a licensed capacity of 12,000 spindles. It has been recognised that the minimum size for an economic unit is 25,000 spindles. Though one or two spinning mill got the licence for expanding its capacity up to 25,000 spindles, all other co-operative spinning mills should also be expanded at the earliest possible time to 25,000 spindles each.

8. *Powerlooms.*

8.1 There were about 6,880 powerlooms in existence in Tamil Nadu at the end of the Third Plan period. About 50 per cent of the Powerlooms are organised in Small Units of four looms and below. Only about 2/3rd of the powerlooms in existence are reported to be active. At present there are 27,608 powerlooms. Their production would amount to 3·2 million meters per day at full installation at 80 meters per day of 3 shifts.

Districtwise details of Powerloom is given below :—

Serial number and District.	*Private.*	*Corporation.*	*Unauthorised.*
(1)	(2)	(3)	(4)
1. Coimbatore	8,591	120	10
2. Salem	7,430	..	5,279
3. Tiruchirappalli	179	..	279
4. Madurai	4,521	..	24
5. Ramanathapuram	387	..	4
6. Tirunelveli	359	..	148
7. Madras	275	..	2
Total ..	21,742	120	5,746

Total existing Powerlooms 27,608.

8.3 On the basis of the recommendation of the Powerlooms Enquiry Committee the Government of India have allocated 12,500 powerlooms for introduction in Tamil Nadu during the Fourth Five-Year Plan period.

8.4 Details of allotment made out of State quota of 12,500 powerlooms is as under :—

Serial number and District.	*Private sector.*		*Co-operatives.*	
	1970–71.	1971–72.	1970–71.	1971–72.
(1)	(2)	(3)	(4)	(5)
1. Coimbatore	176	1,355	180	Allotment to be made.
2. Salem	12	279	170	
3. Tiruchirappalli	45	411	52	
4. Madurai	100	132	49	
5. Ramanathapuram	39	4	49	
6. Tirunelveli	91	16	..	
7. Madras	37	150	..	
Total ..	500	1,997	500	

8.5 The Government of Tamil Nadu have also taken a decision to introduce powerlooms on a phased programme among the co-operative and Private Sectors. Accordingly, as a first phase 500 powerlooms each to the weavers co-operative societies and to the individual waevers were allotted for the year 1970–71.

8.6 The 500 powerlooms for the co-operative sector were allotted among 30 weavers co-operative societies. A loan of Rs. 11·33 lakhs was also sanctioned to the weavers co-operative societies as detailed below :—

(RUPEES IN LAKHS).

(1) For purchasing powerloom motors, accessories, etc., at the rate of Rs. 1,700 per loom to 30 weavers co-operative societies.	8·50
(2) For construction of workshed to house the powerloom at Rs. 1,000 per loom to 9 weavers co-operative societies.	1·83
(3) For setting up of a sizing unit at Salem by the Salem Co-operative Spinning Mills.	1·00
Total ..	11·33

8.7 Regarding the assistance for the individual weavers, the powerloom industry has been included in the list of industries that are eligible for assistance under the State Aid to Industries Act. Besides, the Commercial Banks have come forward to extend financial assistance to individual members on merits. The Handloom Finance Corporation is financing for the working capital.

8.8 As a second phase 536 powerlooms were allotted to 35 weavers co-operative societies, during 1971–72. A loan of Rs. 9·12 lakhs was sanctioned for the purpose.

8.9 Including the allotment of powerlooms to individuals made during 1970–71, 4,321 powerlooms have been allotted to individuals as on 31st March 1972.

8.10 Based on the recommendations of the Ashok Mehta Committee, the individual weavers are entitled for an allotment of 6,250 powerlooms during the 4th plan period. More encouragement to industrial co-operatives may be given. Excluding the allotment made till 29th February 1972, only 1929 powerlooms can be allotted further. Even for disposing the 1,509 pending applications as on 29th February 1972 at 2 per applicant we would be requiring more quota, exceeding 50 per cent of the total allotment of 12,500 looms. It is reported that more than 10,000 applications are pending scrutiny with the head offices on date and that on an average of 50 applications are being received every day.

8.11 Excluding the allotment of 1,036 powerlooms till the middle of 1972 to weavers co-operative societies and 1,000 to Tamil Nadu Textile Corporation made till September 1972 a balance of 4,214 powerlooms are available for introduction among weavers co-operative societies in the coming years.

8.12 From the foregoing, it will be seen that, in spite of the best efforts, it is not possible entirely to ensure that only genuine handloom weavers derive the benifits of the powerlooms allotted to them. Most of the powerlooms taken by the Handloom Weavers end up ultimately in the control of master weavers on account of the reasons mentioned above. Further, it has been represented that unless 4 powerlooms are given to an individual, it may not work out economically. By giving only two powerlooms per individual, the compulsion to seek the assistance of the Master Weavers will only get all the more strengthened. Therefore, if the spirit of the Government instructions have to to be translated into practice by providing for the benefits of the powerlooms to accrue mainly to the master weavers, it will be necessary to sanction powerlooms more and more in the Co-operative sector.

8.13 The introduction of 12,500 powerlooms would mean that a higher proportion of yarn produced in Madras State would be consumed within Tamil Nadu and the powerlooms would be producing the type of cloth which would be in conformity with the changing trends in public taste.

8.14 On the findings of the market research study conducted by South India Textile Research Association, it has been found that as income goes up, there is a tendency for people to change from handloom to mill made cloth, from traditional to cosmopolitan dress habits and from natural to man made fibres. Therefore the spinning mills and

powerlooms should produce the type of yarn and fabrics suitable for the changing pattern of consumption. This will require facilities for finishing powerloom cloth. Hence along with the introduction of powerlooms finishing plants should also be installed.

8.15 The powerlooms could be located such that the transport of yarn from spinning mills to powerlooms and transfer of cloth from powerlooms to finishing plant are reduced to a minimum. The required number of finishing plants to serve the powerlooms both inside and outside the co-operative sector will have to be worked out and such plants may be put up in suitable areas. The types of processing to be done will have to be decided in relation to the changing needs of the market . This is a very important field requiring further technical investigation.

9. *Exports of Handloom Goods.*

9.1 Handloom goods have been exported to other countries from time immemorial. During the present century, handloom goods of traditional items as lungies, saries, etc. had a ready market in countries in South East Asia, Middle East and African countries where the Indians had settled down. Up to 1960, our major export was of these items to these traditional markets. Since then, the Handloom Industry had to diversify its production and has begun to cater more and more to the tastes of the sophisticated markets in Western hemisphere.

9.2 A Statement, giving variety-wise exports of handloom goods from 1962 to 1971, is attached. It will be seen that from a total figure of Rs. 10·1 crores in 1962, expots have reached a substantial figure of Rs. 26·8 crores in 1971. It would be interesting to note that cotton handloom exports have steadily gone up from Rs. 6·7 crores in 1961 to Rs. 19·5 crores in 1971. The majority of the cotton handloom products exported out of India are manufactured in the State of Tamil Nadu. Up to 1965, Bleeding Madras had caught the fancy in the American markets and in 1965, there was a record export of Rs. 6 crores of this single item. The demand suddenly dropped from 1966 onwards owing to various factors like over-flooding of the market, substandard goods, etc. The Handloom Industry in Tamil Nadu had, therefore, to find other varieties which could capture the markets and has successfully done so in the field of Seer Sucker, Madras, Checks, Real Madras Handkerchiefs, etc.

9.3 In regard to silk also, a story similar to that of Bleeding Madras was repeated. in the case of scarves and stoles. Our exports of silks had risen from Rs. 1·2 crores in 1962 to Rs. 3·4 crores in 1967. Suddenly, there was some unpresedented demand for silks and the exports of silks rose to Rs. 5·5 crores in 1968, Rs. 14·2 crores in 1969 and Rs. 13·5 crores in 1970. Thereafter, it has fallen to Rs. 7 crores in 1971. This was mainly due to enormous quantity of silk scarves and stoles exported to Europe during the year 1969-70 as also poor quality of these items exported in the later stages. Sophisticated markets in Europe and America have started taking more and more of garments, the export of which has reached a substantial figure of Rs. 3.95 crores in 1971. Most of the basic materials for the production of cotton handloom garments are produced in Tamil Nadu and the other Southern States.

9.4 It could, thus, be seen that sustaining exports and increasing it further is of paramount importance to producers of handloom cloth in Tamil Nadu. Most of the material is purchased by up-country buyers for ultimate exports. The Tamil Nadu Government, in order to encourage exports, have sanctioned a 2 per cent incentive on the FOB value of exports effected from the Madras Port. This incentive is not likely to benefit the handloom manufactures in Tamil Nadu because—

(*a*) Exports effected from Madras by air have not been made eligible for the incentives.

(*b*) Many of the producers and exporters in Tamil Nadu export not only from Port of Madras but also from Tuticorin, Nagapattinam and Cochin.

(*c*) Products of Tamil Nadu are bought by up-country buyers as stated above and exported from Calcutta, Delhi and Bombay.

9.5 In order to provide the incentive for producers and exporters in Tamil Nadu, it should be made available to all exporters from Madras State, based on the total exports made by them during the year irrespective of port of shipment or port of air freight.

9·6 The most important aspect to be considered in increasing exports is the steady supply of raw materials both cotton and silk yarn. From 1971 onwards, the price of cotton yarn have been steadily going up. Similarly, the prices of silk yarn have also been fluctuating often and have been on the upward trend during the whole of last year. Exporters generally enter into long term contract with buyers in all foreign countries and deliveries generally are to be made within six months from the date of contract. Often exporters have been compelled to default in their shipments owing to the cost of the raw material in the intervening period having considerably gone up. It is, therefore, essentia that the Government should make arrangements for supply of raw materials like cotton yarn and silk yarn at reasonable prices to the exporters to enable them to quote competitive prices to buyers in the foreign markets. In case, there is any fluctuation in the prices the difference should be made good in the form of subsidy by Government.

9.7 Another factor which affects the exports is the frequent change in the cash incentive. In order to compete in the international market, prices for handloom goods are quoted after taking into consideration the cash incentive given on the exports. These contracts are entered into almost six months in advance and the prices would be effective for deliveries made even after six months of the contracts. This being the case, any change in the incentive structure seriously affects the prices and accordingly, many of the exporters are unable to fulfil their contracts. It is, therefore, imperative that the rate of incentives should be constant for atleast a year and if any change is to be effected, alteast six months due notice should be given before such changes are effected.

9.8 The handloom materials have to compete with machine made products of not only our country but other countries also. It is only when the exporters are able to convince the foreign buyers as to the varieties which handloom can offer, the colour combinations, designs, construction, etc., that the foreign importers would be inclined to

buy handloom products and place orders for them. In this context, it would be necessary for exporters to tour foreign markets constantly to secure orders. The restrictions which the Reserve Bank have in allowing foreign exchange for such visits to exporters should be liberalised, so as to allow more and more exporters to go abroad and secure market for handloom products.

9·9 The attraction of handloom products to sophisticated buyers is mainly due to the designs, varieties, textural combinations and colour combinations which the products are able to offer. In this regard the Weavers Service Centre set up by the All India Handloom Board have been assisting the handloom industry in evolving new types of designs, new colour combinations, new texture of combination, etc. They have also given technological guidance to the weavers. The facilities offered by these centres should be utilised more and more by the weavers in Tamil Nadu, so that they are able to cater to the change in fashions in the markets abroad.

10. *Focus for future.*

10·1 There will necessarily have to be larger expenditure on the provision of subsidies, supply of components for Handlooms, installation of Powerlooms by Weavers Co-operative or by individual families and for the establishment of units for manufacturing chemicals like the hydrosulphite of soda and finishing plants. There will of course be need to continue an even more liberal system of rebates and even new schemes which will facilitate easier marketing of a growing volume of handloom products. While the outlay under different heads in the 5th plan period will have to be Rs. 29·20 crores, it will have to be raised to Rs. 40 crores in the subsequent plan period though as the years pass by the accent is likely to be on the installation of powerlooms in larger numbers and facilities for processing and finishing in order to bring about a distinct change in the pattern of production. The objective is to employ 4 million people with a larger number of Handlooms and double production though actual progress may depend on new job opportunities that will be available in the coming years and the anxiety of the weavers themselves to increase their income by partial mechanisation of Handloom or enlarging the Powerloom Sector.

11. *Recommendations.*

11·1 *Employment Orientation* —New Plans should be worked out. The perspective plan has to stress considerably on the need for creating labour intensive industries. In this regard, the development of the Handloom satisfies the requirement. Its employment potential is far higher than most other industries. What is more, it conforms to the ideals of decentralised planning. For an investment of Rs. 500 we can employ on an average two persons. For the total outlay of about Rs. 10 crores during the present plan period, the number of people employed in this industry compares very favourably with any other economic activity of such large outlay. Thus, the supreme need of sociological importance of handlooms comes to be stressed. With Rs. 10 crores assistance it becomes possible to provide employment for about 10 lakhs of persons for 5 years—in other words, it means we keep such a large number employed throughout the year by spending Rs. 20 per head per year.

11·2 *Mills* vs. *Handlooms.*—In 1946, Mahatma Gandhi in a "Harijan" article stated that the future needs of cloth in the country should be completely met by handlooms and that the mill sector should concentrate on export of the cloth manufactured by them.

Only in certain sectors like army, police, etc., where a uniform dress is essential, the mill cloth may be used, was the suggestion, put up by the "Father of the Nation". This was mainly for the purpose of providing more occupation to the villagers and to see that the village economy revive after freedom. Unfortunately his suggestion was not accepted. But the mill sector was permitted to expand with a lot of facilities from Government and financial institutions, which very badly affected the handloom sector. The net effect was (in 1951–52) that the whole handloom industry was in great crisis and the handloom weavers had even to be fed by provision of gruel centres in many places.

11·3 Now after our respected Prime Minister has enunciated the policy of "Garbi Haeto" and full employment, it is strongly felt that the only way by which the rural area can be immediately helped by more employment is to expand the handloom sector. At present, handloom manufactures about 2,260 million metres and powerlooms make about 1,300 million meters. The mill sector manufactures about 4,200 million metres. It would take time to build up production in the handloom sector and so it may not be immediately possible to completely replace mill production, either by the handloom or by the powerloom. A reasonable compromise will be to prescribe that the mill sector should export one-third of their production. This reduced availability will enable the decentralized sector to enlarge the share of the home market and hence it will be possible to double production and the Powerloom as well as the Handloom.

11·4 *Organisational.*—The creation of an organisation for the purpose of buying yarn from the mills on the basis of processing charges, and distributing the same to handlooms and powerlooms and also for purchasing the finished output of the decentralised sector for marketing them to the consumers may be considered. Such an organisation can be in the shape of a Public Limited Company preferably in the joint sector.

11·5 *Problem of raw material supply.*—Arrangements should be made in such a way that the primary societies should get their entire requirements of cotton yarn of various counts from the co-operative spinnning mills through the Apex Society.

With regard to dyes and chemicals, the existing arrangements to supply them through Apex Weavers Co-operative Society may be continued.

11·6 *Marketing of handloom cloth—*

(i) Encouragement should be given for the opening of more Inter-State Depots.

(ii) The scheme of credit sales to Government Servants may be extended to the employees of the Central Government.

(iii) The Government of Tamil Nadu may issue directions to various administrative departments to place orders with the Tamil Nadu Handloom Weavers' Co-operative Society to meet atleast 50 per cent of their requirements.

(iv) The Central Government may be requested to issue direction to their departments both civil and military, for diverting a portion of their departmental requirements of handlooms.

(v) Dhoties and saries should be exclusively reserved for the Handloom Sector and all the existing rules relating to reservation may be strictly enforced.

11·7 *Market Survey—*

11·7·1 Arrangements may be made to undertake market studies in important towns and villages on a continuous basis covering all aspects relating to the fashion trends, price structure, fluctuation in demand and supply for various types of fabrics, etc.

11·7·2 Steps may also be taken to improve and streamline the collection of statistics covering all aspects of Handloom Industry in the Directorate of Handlooms and Textiles. For this purpose, a separate statistical cell manned by a qualified statistician must be created at the central office.

11·8 *Exhibition.*—Instead of the present routine by way of conducting exhibitions, special exhibitions should be conducted at various State capitals and other important places coinciding with festivals of local importance.

11·9·1 *Publicity and Propaganda.*—A separate propaganda and publicity wing may be created in the Directorate of Handlooms and Textiles and the entire work connected with the publicity and propaganda may be entrusted to it. For effectively organising publicity for handloom products on modern lines, both within and outside the country, the services of publicity experts may be utilised by the Directorate of Handlooms and Textiles and the Tamil Nadu Handloom Weavers' Co-operative Society. An Officer of the rank of Assistant Director with necessary staff may be appointed in the office of the Director to attend to this work.

11·9·2 *Credit facilities.*—The present credit limit of working capital accommodation extended to primary societies is only 25 per cent of the value of the production and this should be enhanced at least to 40 per cent. The State Government may take up the matter with the Government of India and the Reserve Bank to enhance the limit.

11·10 *Incentives.* The following incentives are recommended :—

(*a*) *Rebate.*—It is recommended that 10 per cent rebate may be allowed during normal days, and 15 per cent during 100 days of special seasons.

(*b*) *Expert help to Apex Society.*—In marketing, publicity, designing, etc., Apex Society should adopt sophisticated techniques involving experts to help in the project.

(*c*) *Requirements of Government depots.*—The various departments should purchase a sizeable portion of their cloth requirements from Apex Society.

(*d*) *Excise duty.*—(i) The disparity in the excise duty between powerloom and mill cloth may be removed. (ii) exemption should be obtained for all counts in hank form.

(*e*) *Sales Tax.*—There should be no sales tax on any kind of yarn consumed by handloom.

(*f*) *Export incentives.*—Export incentives offered by State Government should be available to exports made by our State exporters through any sea port or airport in India.

11·11 *Quality control.*—To undertake quality control of handloom fabrics, three to four district in the State, where there are concentration of handloom weavers, may be selected for intensive development with the co-operation of Weavers' Service Centres. To ensure systematic inspection of fabrics for enforcing quality control, both during their

processees of manufacture and in the finished state for affixing quality seal on the label, one Inspector and helper may be appointed for every 100 looms. An Officer of the rank of an Assistant Director of Handlooms and Textiles may be appointed to organise and supervise the work connected with the quality marking scheme. More Service Centres may be opened by the All India Handloom Board in places where there are concentration of weavers like Districts of Salem, Madurai and Coimbatore. Quality Marking recommended by the All India Handloom Board may be followed.

11·12 *Technical Improvements*—

(*a*) Handloom cloth processing shlould be explored to meet various types of consumer preferences.

(*b*) Steps have to be taken to expand the capacity of the mercerising and sanforising plants of the Tamil Nadu Handloom Weavers' (Co-operative Society to meet the growing needs of finished fabrics.

(*c*) All India Handloom Board should establish more Service Centres providing for all facilities like designing, dyeing, etc, in other important centres like Salem, Coimbatore and Madurai. This is necessary to make available all benefits of research and expertise to all the weavers spread all over Tamil Nadu.

11·13 *Powerlooms*—

(i) More powerlooms may be sanctioned in the co-operative sector.

(ii) In areas where powerlooms have not developed and where there is concentration of handloom weavers, Industrial Weavers Co-operative Socicties for Powerlooms may be started.

(iii) The Spinning Mills and Powerlooms should produce the type of yarn and fabrics suitable for the changing pattern of consumption.

11·14 *Weavers Welfare*—The following welfare measures are recommended to meet the lot of people engaged in Handloom Industry :—

(i) The rules relating to the Contributory Thrift Fund Scheme should be relaxed and broad based in such a manner the benefits of the scheme reach all the weavers.

(ii) Special Housing programmes should be undertaken to provide better housing facilities to the weavers in the shape of work-*cum*-residence spots. To implement the housing programme in a continous manner it may be necessary to create a revolving fund consisting of contributions from the State Government, the Government of India, the Life Insurance Corporation, etc., and it is also suggested that a realistic pattern of assistance providing for larger quamtum with enhanced subsidy may be adopted.

11·15 *Revival of Dormant Societies.*—Intensive efforts may be taken to revive the dormant societies and put them on a sound footing. The State Government should give special financial assistance so that an effective scheme of revival of dormant societies can be evolved by the Directorate of Handlooms and Textiles in consultation with Co-operative Central Banks and Tamil Nadu Handloom Weavers' Co-operative Society.

TABLE I.

EXPORT OF HANDLOOM GOODS DURING 1961–71.

(Figures in 000's)

Serial number.	Variety.	1961. Quantity.	1961. Value.	1962. Quantity.	1962. Value.	1963. Quantity.	1963. Value.
(1)	(2)		(3)		(4)		(5)
					(VALUE IN RUPEES.)		
I	'A' Cotton Handloom Fabrics of standard type—						
	(1) Bleeding Madras (Mts.) ..	N.A.			..	6,506	17,491
	(2) Real Madras Hand-kerchiefs (Mts.)				7,697	4,614	8,310
	(3) Lunghies and sarongs (Mts.)				21,862	9,214	23,246
	(4) Dhoties (Mts.)				957	356	544
	(5) Sarees (Mts.)				2,330	2,908	4,180
	(6) Shirtings (Mts)				346	103	172
	(7) Others (Mts.)				24,652	9,504	23,314
	Cotton handloom fabrics—Sub-total.		47,866	25,959	57,845	33,215	77,257
	'B Cotton Handloom non-fabrics—						
	(1) Carpets and durries (Mts.) ..	..	..	..	4,331	..	4,951
	(2) Bed-sheets and blankets (Kgs.)	..	..	..	5,222	..	6,183
	(3) Pillow-covers and 7' cloth (Kgs.)	..	..	..	..	..	..
	(4) Towels and napkins (Kgs.) ..	..	..	..	..	..	..
	(5) Others (Kgs.)	..	..	..	140	..	281
	Cotton handloom non-fabrics—Subtotal.				9,693		11,415
	'C' Cotton Handloom Readymade Garments (Nos.)—	..	..	..	..	..	..
	Cotton—Total ..		47,866		67,588		88,672
II	Silk Fabrics—						
	(1) Mulberry silk fabrics (s.mts.)	..	..	829	8,607	1,589	15,182
	(2) Tassar silk fabrics (s.mts.) ..	..	..	237	3,637	499	6,429
	Silk—Total ..				12,244		21,611
III	Fabrics of regenerated fibre (Mets).	..	..	9,536	21,636	8,534	32,016
IV	Woolen items.—						
	(1) Woollen and worsted fabrics (Mts.)	..	..	5	51	149	628
	(2) Woollen blankets (Kgs.) ..	..	..	..	..	..	..
	Woollen—Total ..				51		628
	Total—other than cotton ..				33,931		54,255
	GRAND TOTAL ..		47,866		1,01,469		142,927

TABLE—I—*cont.*

EXPORT OF HANDLOOM GOODS DURING 1961–1971—*cont.*

(Figures in 000's.)

Serial number.	*Variety.*	1964. *Quantity.*	1964. *Value.*	1965. *Quantity.*	1965. *Value.*	1966. *Quantity.*	1966. *Value.*
		(6)		(7)		(8)	
					(VALUE IN RUPEES.)		
I	*'A' Cotton Handloom Fabrics of standard type.—*						
	(1) Bleeding Madras (Mts.) ..		41,109	21,982	61,385	4,401	1,078
	(2) Real Madras Hand-kerchiefs (Mts.)		9,575	5,532	11,180	9,024	19,504
	(3) Lunghies and Sarongs (Mts.).		18,907	4,395	10,008	6,687	18,685
	(4) Dhoties (Mts.)		370	2,315	2,479	3,252	14,958
	(5) Sarees (Mts.)		2,162	1,263	1,451	8,134	14,978
	(6) Shirtings (Mts.)		619	875	2,187	1,090	1,624
	(7) Others (Mts.)		5,013	3,333	6,573	4,428	7,151
	Cotton handloom fabrics—Sub-total.	33,721	77,755	39,695	95,263	37,016	67,274
	'B' Cotton handloom non-fabrics.—						
	(1) Carpets and durries(Mts.)		5,244	2,463	5,071	2,456	6,086
	(2) Bed-sheets and blankets (Kgs.) ..		6,099	582	5,854	614	6,539
	(3) Pillow-covers and 7' cloth (Kgs.) ..		..	18	165	35	396
	(4) Towels and napkins (Kgs.)		..	97	543	64	629
	(5) Others (Kgs.)		228	30	1,287	18	620
	Cotton handloom non-fabrics-Sub-total.		11,571		12,920		14,370
	'C' Cotton Handloom Ready-made garments (Nos.)	..	7,067	N.A.	17,576	N.A.	2,522
	Cotton—Total		96,393		1,25,759		84,166
II	*Silk Fabrics.—*						
	(1) Mulberry silk fabrics (s.mts.)	1,410	13,851	1,848	17,310	1,735	22,227
	(2) Tassar silk fabrics (s.mts.) ..	641	8,445	548	7,187	325	4,615
	Silk—Total ..		22,296		24,497		26,842
III	Fabrics of regenarated fibre (Mets.)	5,140	13,104	686	1,693	184	297
IV	*Woollen items.—*						
	(1) Woollen and worsted fabrics (Mets.)	10	61	92	684	81	966
	(2) Woollen blankets-(Kgs.) ..	..	..	7	33	21	130
	Woollen—Total ..		61		717		1,096
	Total—Other than Cotton ..		35,461		26,907		28,235
	GRAND TOTAL ..		1,31,854		1,52,666		1,12,401

TABLE I—*cont.*

EXPORT OF HANDLOOM GOODS DURING 1961—71—*cont.*

(Figures in 000's).

Serial number.	*Variety.*	1967.		1968.		1969.	
		Quantity.	*Value.*	*Quantity.*	*Value.*	*Quantity.*	*Value.*
		(9)		(10)		(11)	
			(VALUE IN RUPEES.)				
I	*'A' Cotton Handloom Fabrics of standard type.—*						
	1 Bleeding Madras (Metres) ..	47	167	19	65	49	78
	2 Real Madras Hand-kerchiefs (Metres).	8,817	19,959	4,863	7,400	7,126	13,269
	3 Lunghies and sarongs (Metres).	7,473	24,031	9,410	28,924	12,185	38,397
	4 Dhoties (Metres)	10,161	14,763	534	738	2,615	4,593
	5 Saries (Mts.)	752	1,463	2,018	2,965	612	1,328
	6 Shirtings	907	1,105	28	80	199	524
	7 Others (Metres)	3,715	6,971	1,867	5,545	2,762	9,351
	Cotton handloom fabrics—Sub-total.	31,872	68,459	18,739	45,717	25,548	67,540
	'B' Cotton Handloom non-fabrics—						
	1 Carpets and durries (Mts.) ..	1,865	5,098	3,325	8,985	4,083	11,233
	2 Bed-sheets and blankets (Kgs.)	756	9,741	1,531	20,350	1,570	19,776
	3 Pillow-coversand 7'cloth (Kgs.).	38	565	104	1,265	136	1,844
	4 Towels and napkins (Kgs.) ..	137	1,566	406	4,636	718	8,139
	5 Others (Kgs.)	37	948	22	913	25	981
	Cotton handloom non-fabrics—Sub-total.		17,918		36,149		41,973
	'C' Cotton Handloom Ready-made garments. (Nos.)	39	547	131	1,156	..	7,752
	Cotton—Total ..		86,924		83,022		1,17,265
II	*Silk Fabrics.—*						
	1 Mulberry silk fabrics (S.mts.)	1,747	28,785	2,574	41,821	8,522	1,23,121
	2 Tassar silk fabrics (S.mts.) ..	370	5,418	913	13,195	1,262	19,658
	Silk—Total ..		34,203		55,016		1,42,779
III	Fabrics of regenerated fibre—(Mets).	148	419	89	265	65	169
IV	*Woollen items.—*						
	1 Woollen and worsted fabrics (Metres).	34	629	33	503	18	378
	2 Woollen blankets (Kgs.) ..	16	110	12	89	8	134
	Woollen—Total ..		739		592		512
	Total—other than cotton ..		35,361		55,873		1,43,460
	GRAND TOTAL ..		1,22,285		1,38,895		2,60,725

TABLE I—*cont.*

EXPORT OF HANDLOOM GOODS DURING 1961—1971—*cont.*

(Figures in 000's)

Serial number.	*Variety.*	1970. *Quantity.*	1970. *Value.*	1971. *Quantity.*	1971. *Value.*
		(12)		(13)	
					(VALUE IN RUPEES).
I	*'A' Cotton Handloom Fabrics of standard type.—*				
	1 Bleeding Madras (Metres) ..	54	134	270	1,128
	2 Real Madras Hand-kerchiefs (Metres).	8,526	18,170	9,572	27,142
	3 Lunghies and sarongs (Metres).	9,793	29,507	8,458	29,183
	4 Dhoties (Mts.)	3,441	5,736	285	575
	5 Saries (Mts.)	459	1,130	330	921
	6 Shirtings	302	722	1,827	3,566
	7 Others (Mts)	5,919	18,780	6,990	29,300
	Cotton handloom fabrics—Sub total.	27,494	74,179	27,732	91,815
	'B' Cotton handloom non-fabrics.—				
	1 Carpets and durries (Mts.) ..	3,195	8,623	3,377	8,757
	2 Bed-sheets and blankets (Kgs.)	1,919	25,382	2,092	3,269
	3 Pillow-covers and 7' cloth (kgs).	95	1,358	158	2,326
	4 Towels and napkins (Kgs.) ..	1,133	13,136	1,433	17,784
	5 Others (Kgs.)	49	1,478	85	2,589
	Cotton handloom non-fabrics—Sub-total.		49,977		64,325
	'C' Cotton handloom Ready-made garments. (Nos.)		22,927		39,538
	Cotton—Total ..		1,47,083		1,95,678
II	*Silk Fabrics.—*				
	1 Mulberry silk fabrics. (Smts.)	7,815	1,22,251	3,825	58,636
	2 Tassar silk fabrics (s.mts.) ..	768	13,572	629	11,443
	Silk—Total ..		1,35,823		70,079
III	Fabrics of regenerated fibre (Metres).	93	324	175	486
IV	*Woollen items.—*				
	1 Woollen and worsted fabrics (Mts.)	27	520	112	2,022
	2 Woollen blankets (Kgs.) ..	28	318	11	162
	Woollen—Total ..		838		2,184
	Total—other than cotton ..		1,36,985		72,749
	GRAND TOTAL ..		2,84,068		2,68,427

TABLE II.

PROGRESS OF SCHEMES (ON FINANCIAL).

Serial number and name of the scheme.	*Third Plan expenditure.*	*Fourth Plan provision.*	*Actual for*		
			1966–67.	1967–68.	1968–69.
(1)	(2)	(3)	(4)	(5)	(6)
		(RUPEES IN LAKHS.)			
1. Share capital assistance (Admission of weavers into co-operative fold).	38·23	30·00	4·16	2·16	2·99
2. State participation in the share capital of Primary Weavers Co-operative Societies.	..	25·00	..	4·00	5·00
3. Subsidy towards interest on Working Capital Loan.	33·00	65·00	10·50	10·62	9·00
4. Research and Technique	67·16	68·00	6·03	2·22	2·65
5. Rebate	314·52	325·00	64·00	64·00	84·45
6. Marketing and Publicity	30·37	61·75	7·11	7·45	6·50
7. Co-operative Spinning Mills	119·81	135·00	70·00	10·20	10·00
8. Industrial Weavers' Co-operative Societies ..	11·93	9·75	0·04	0·11	..
9. Housing	56·13	27·00	1·22	0·08	..
10. Contributory Thrift Fund	5·16	15·00	1·80	1·80	1·89
11. Silk and Art Silk Industry	8·52	13·25	9·13	4·19	0·54
12. Training	3·97	11·25	1·41	1·57	1·45
13. Subsidy for Managerial Staff	3·10	5·00	0·50	0·49	0·39
14. Share capital to Apex Society	12·00	12·00	..	2·70	0·80
15. Organisational expenses	23·50	26·00	5·46	3·96	3·60
16. Loan to relieve indebtedness of weavers	5·11	..	0·96	..	..
17. Handloom Finance Corporation	12·60	5·00	..	..	..
18. Collection of Statistics	4·39	5·00	1·03	1·16	1·23
19. Research section of Government Textile Institute.	0·06	..	..	..	..
20. Subsidy towards loss sustained in the issue of working capital loan.	0·05	5·00	0·10	1·29	..
21. Powerlooms	..	216·00	..	..	..
22. Subsidy towards employment of staff for Contributory Thrift Fund Account.	..	..	..	..	..
23. $\frac{7}{8}$th cost of supervision staff	..	..	..	..	..
Total ..	750·30	1,060·00	183·45	118·00	130·60

Serial number and name of the scheme.	*Actual for*—cont. 1969–70.	*Actual for*—cont. 1970–71.	*Estimated for* 1971–72.	*Proposed for* 1972–73.
	(7)	(8)	(9)	(10)
		(RUPEES IN LAKHS.)		
1. Share capital assistance (Admission of weavers into co-operative fold).	2·00	5·80	3·75	6·00
2. State participation in the share capital of Primary Weavers Co-operative Societies.	9·00	8·00	5·00	10·00
3. Subsidy towards interest on Working Capital Loan.	11·00	11·52	13·00	13·00
4. Research and Technique	2·65	6·62	10·00	2·00
5. Rebate	190·00	110·00	110·00	110·00
6. Marketing and Publicity	6·95	5·39	2·00	7·00
7. Co-operative Spinning Mills	15·34	15·34	0·25	25·00
8. Industrial Weavers' Co-operative Societies	0·20	1·80	1·30	1·15
9. Housing	..	..	..	..
10. Contributory Thrift Fund	2·00	2·05	2·75	2·75
11. Silk and Art Silk Industry	0·70	0·86	0·63	0·42
12. Training	1·27	4·45	5·82	5·83
13. Subsidy for Managerial Staff	0·50	0·89	1·00	0·50
14. Share capital to Apex Society	1·00	..	20·00	..
15. Organisational expenses	3·60	5·58	5·50	5·05
16. Loan to relieve indebtedness of weavers	..	..	..	..
17. Handloom Finance Corporation	7·40	5·00	45·00	..
18. Collection of Statistics	1·26	1·26	1·00	1·00
19. Research section of Government Textile Institute.	..	..	..	..
20. Subsidy towards loss sustained in the issue of working capital loan.	0·19	0·30	2·00	3·00
21. Powerlooms	..	11·33	23·00	41·04
22. Subsidy towards employment of staff for Contributory Thrift Fund Account.	..	0·12	0·12	0·12
23. 7/8th cost of supervision staff	..	0·75	1·00	0·75
Total ..	145·06	197·06	253·12	234·61

PROPOSED FIFTH PLAN OUTLAY FOR HANDLOOMS.

Group Head.	*Fifth Five-Year Plan Provision (Tentative) 1974–75 to 1978–79.*
	(RUPEES IN LAKHS.)
1. Share capital assistance (Admission of Cotton Weavers into Co-operative fold) ..	60·00
2. Subsidy towards interest on Working Capital Loan	130·00
3. State participation in the share capital of Primary Weavers Co-operative Societies.	50·00
4. Research and Technique	136·00
5. Rebate	650·00
6. Marketing and Publicity	123·50
7. Co-opertive Spinning Mills	270·00
8. Industrial Weavers' Co-operative Societies	19·50
9. Housing	54·00
10. Contributory thrift fund	30·00
11. Silk and Art Silk Industry	26·50
12. Training	22·50
13. Subsidy to Co-operative Central Banks towards loss sustained in the issue of Working Capital Loan.	10·00
14. Subsidy for Managerial Staff	10·00
15. Share capital to Apex Society	24·00
16. Organisation Expenses	52·00
17. Subsidy to Co-operative Central Banks towards the cost of special staff employed for the maintenance of C.T.F. Account.	..
18. Handloom Finance Corporation	10·00
19. Collection of Statistics	10·00
20. Subsidy to Co-operative Central Banks towards $\frac{7}{8}$ in the cost of the employment of staff supervision of W.C.S. Financed with R.B.I. Funds.	..
21. Powerlooms	432·00
22. Loans under the control of the Director of Handlooms and Textiles	..
23. Processing and finishing Centres	800·00
Total ..	2,920·00

INVESTMENT OF HANDLOOMS.

(1)	*Investment.* (2) (RUPEES IN CRORES.)	*Value added by manufacture.* (3) (RUPEES IN CRORES.)	*Employment potential.* 4) (NUMBER OF PERSONS.)
Vth Plan	30	60	60,000
VIth Plan	30	60	60,000
Total ..	60	120	120,000

CHAPTER XIII.

Sugar Mill Industry.

1. The sugar industry has attained a new stature in the past decade and with an unprecedented growth in consumption of refined sugar, the need has arisen for achieving much faster rate of growth in the coming years. At the beginning of the Plan era, All-India production was only 11·34 lakh tonnes and this rose to 18·90 lakh tonnes in 1955–56 and, a decade later, to a new high level of 35·32 lakh tonnes (1965–66). Four years later, in 1969 70, a fresh peak of 42·65 lakh tonnes was touched. At this stage, consumption and exports could not absorb fully current production when stocks were exceptionally heavy at 21·88 lakh tonnes. These developments gave rise to the misleading impression that there would be a slower growth of consumption and it would take some time to catch up with production. The developments in the Fourth Plan Period, however, have unmistakably indicated that new trends in consumption have emerged and with an increase in the requirements of the rural population there would have to be a regular growth in production by at least 10 per cent annually with consumption in 1970–71 at 40 lakh tonnes.

1.1 The main producing regions are Uttar Pradesh, Bihar, Maharashtra, Mysore, Tamil Nadu and Andhra Pradesh. The surpluses of these States meet the requirements of other areas which have not been able to produce their requirements fully. The growth in production of the different States since 1950–51 will be evident from Table I.

2. Tamil Nadu has been making its contribution to significant increase in production in the past decade and is now accounting for about 9·58 per cent of the output for the whole country. In 1950–51, there were two mills accounting for an output of 92,342 tonnes and by 1960–61, there was an increase in the number of mills to eight and in production to 1·31 lakh tonnes. It is, however, in the subsequent decade that this vital industry has grown considerably in stature with 12 mills functioning in the co-operative and private sectors producing as much as 2·23 lakh tonnes. Thereafter, four more sugar mills have come on the scene and with the implementation of expansion schemes by many established units, the output in 1971–72 was 2·99 lakh tonnes in respect of 16 mills. In 1972–73, the output will be further higher at 3·20 lakh tonnes. The position will be clear from Table III.

3. The industry will have to plan vigorously for increasing production to 6·5 lakh tonnes by 1978–79 and to 90 lakh tonnes by 1983–84. It is assumed that there will be a growth rate of 8 per cent in the first 7 years of the perspective Plan period and of 6 per cent in the subsequent five years. Eventhough, Tamil Nadu has a surplus now after meeting its requirements, it will have to continue to produce more for meeting the needs of other areas besides providing also fully for the requirements of the State population. Even on the basis of the All-India average, consumption in Tamil Nadu, in 1978–79, may be in the region of 5 lakh tonnes in 1978–79 and 6·25 lakh tonnes in 1983–84. There will actually be a higher level of consumption in the region apart from the need for creating large surpluses for being sold in other areas. It may, therefore, be assumed that the target of production, will be 8 lakh tonnes in 1978–79 and 1·1 million tonnes in 1983–84. In the early years an increase in the output by over one lakh tonne can be brought about by making better use

of the existing capacity with greater attention to the cultivation of better varieties of cane over larger areas adjacent to the existing units. As there will have to be a virtual doubling of capacity in 1978-79 at least 12 more factories, with a capacity of 1,500 to 2,000 tonnes daily, will have to be established in Tamil Nadu. As the economics of agriculture has to be improved in Thanjavur and large tracts are available in that district, half the new capacity can be established in this area. This will mean that six new factories will have to be brought into being in five years commencing from 1973-74. It will be advisable to select areas in the interior where there will be no problem of drainage and it will also be possible to achieve a higher recovery. The area required for this purpose will be over one lakh acres. There will be no problem on this account : what is needed is careful attention to cultivation of cane for securing a recovery of over 9 per cent.

3.1 The remaining six factories can be located in Madurai, Tirunevlveli, North Arcot, and South Arcot districts. It will even be advisable to utilise the existing acreage under cane, which is now mainly being used for manufacturing gur, for establishing sugar mills. In that case, the recovery will be fairly high at 9·5 per cent. This will enable a broadening of the base of the industry and a wider dispersal in the coming years. In 1979–84, the objective should be to increase the capacity of the existing units whose number would have risen to 29. The additional capacity of 25,000 tonnes can be easily achieved in the Sixth Plan period by implementing merely expansion schemes. The duty of the Planner will, therefore, lie in raising immediately the output by 50 per cent in the two or three years with the existing facilities by increasing the availability of cane and improving its quality. Subsequently, large areas will have to be brought under cane in entirely new regions and Thanjavur may gain the distinction of being an important producer of sugar besides rice. An opportunity will also be available to Madurai and Tirunelveli districts to make a significant contribution to this effort while Ramanathapuram district will come on the scene, if, at a later stage, there was availability of adequate water resources with diversion of river waters from Kerala eastward. In any case, the outlook for sugar industry in Tamil Nadu is bright and it is needless to say that careful attention to the cultivation of cane will pay rich dividends and strengthen considerably the regions's agricultural economy.

4. *Cane Cultivation.*

4.1 The fixation of a target of 1·1 million tonnes of sugar for 1983-84 will call for a four-fold increase in the output of cane and if there was no increase in sucrose content or yield per acre, the area also will have to be enlarged correspondingly. The land under the crop serving the mills now is one lakh acres which will have to rise to four lakh acres. Since acreage with ample irrigation facilities is restricted in Tamil Nadu, there will have to be a definite improvement in the sucrose content by at least 20 per cent from existing levels besides an increase in the yield by 30 per cent. In that case, the area required will be only two lakh acres for needs of sugar mills alone. There will, of course, be an improvement in productivity of the order envisaged only over a period. The area under the crop adjacent to the existing factories and in the vicinity of new factories, may, therefore, have to be extended. But the objective should be to help these areas to increase their productivity with larger inputs better varieties of cane and modern techniques of cultivation. There should be an obligation on the part of every sugar mill to bring about an increase in productivity on a defined basis in the areas serving it.

5. *Credit for the Industry.*

5.1 The State Government for its part will have to ensure that adequate credit facilities were provided for cultivation of cane by farmers and for making prompt payments to the growers against the sale of cane to factories. Block credits for use by sugar mills for specific purposes from the scheduled commercial banks will facilitate the work of farmers when developing land, sinking wells and energising them or administering larger inputs. The sugar producers will have to be granted automatic credit facilities on the basis of changes in levels of stock of sugar so that payments to cane growers or disbursement of wages to workers are not held up due to seasonal accumulation of stocks. This aspect of the problem is very important as the failure of the lending institutions in the past and the inability of the Central Government to recognise the difficulties of the sugar mills have been responsible for violent fluctuations in the output of sugar.

6. *The Task Force recommends* :—

6.1 There is scope for 12 more sugar factories with a capacity of 1,500 to 2,000 tonnes daily to come up in the districts of Thanjavur, Madurai, Tirunelveli, South Arcot and North Arcot districts to improve the economies of the above districts.

6.2 New sugar mills may be in co-operative sector or private sector or it can be joint ventures. However, the decision can wait for the recommendations of the Sugar Industry Enquiry Commission.

6.3 The most attractive incentive to the industry will be a clear delienation of a long-term policy on sugar by the Government of India. At present, the fortunes are so frequently fluctuating that there is a lot of uncertainty about the future of the industry. The State Government could also think in terms of a Marketing Organisation to handle the sugar produced in the State.

6.4 The general upward trend in recovery all over the State is a welcome portent. Continuous and sustained efforts must be taken to improve this further.

6.5 It is about 7 years since the Committee consisting of Thiru Krishnamurthi and Thiru Murari assessed the cane potential and examined the scope for more sugar factories in the State. In view of limitation of time, the Task Force has not been able to tour the entire State and examine this in detail. This can be effectively and purposefully done only by a thorough inspection of cane areas and dialogue with the cane growers. For this, another Expert Committee may be set up by the Government to make an " on the spot assessment " to determine how the industry can be developed in the different districts of Tamil Nadu having assured irrigation facilities.

6.6 Presently, there are hardly half a dozen firms in the country manufacturing sugar plant and machinery. This is woefully inadequate in a country having more than 200 sugar factories. The sugar factories have been completely at the mercy of these firms for supply of machinery and cases are not wanting when a new unit or an expansion programme has been delayed by years, due to the late delivery of machinery. This state of affairs should not be allowed to continue. In fairness to these firms, it should also be noted that each of these has, on hand, orders for the next four or five years to be honoured. This is an important aspect to be borne in mind while thinking of new units. There is a strong case for the Government itself to set up a few units to manufacture sugar plant and machinery.

This can be done in conjunction with the existing boiler plants and other giant public sector undertakings. If more units in the private sector could be set up, that may also be done. The point is that we need more units to supply sugar machinery. Unless this is done, even the proposed expansion programmes of existing factories may not go through as scheduled.

6.7 Presently, the conditions of competition between sugar factory and other units like Khandasari and crushers are so unequal as to act as a disincentive to the sugar industry. Even the deterrant available under the sugar cane control order is limited and ineffective. As it is, only Khandasari units and crushers, set up by persons, who are neither growers, nor belonging to body of growers, have to take a licence. The others do not have to satisfy even this formality. This exemption is quite exhaustive and will be inconsistent with the interests of sugar factories when jaggery prices rule high. These exemptions should be withdrawn by Government of India and a system of licensing should be enforced on all so that the location should be regulated by the Government.

6.8 In view of the larger area that will be coming under cane and the importance of improving road communication facilities in the existing areas, the State Government should utilise the greater proportion of the amounts realised by way of cess on cane purchased by sugar factories. Greater attention should also be paid to an improvement in the quality and yield of cane per acre.

6.9 Marketing arrangements for the surplus sugar must be satisfactory and Government will have to play a larger role in this. Incentives must be offered to sell our sugar in up-country and international markets. Full remission of cess on sugar exported outside the State and transport subsidy for marketing it in other urban centres may be considered. The Industry should never be burdened with glut to enable prompt payment to cane-growers.

6.10 Adequate credit facilities are needed for helping sugar producers to make prompt payments to cane growers when there is seasonal accumulation of stocks and there are also indication of an unexpected increase in stocks as in 1970. The cane growers too should be given liberal assistance for developing land and administering larger inputs.

TABLE I.

Changing importance of producing regions.

(IN LAKH TONNES).

State.	1965–66.		1969–70.		1970–71.		1971–72.	
	Production.	*Percentage to total*	*Production.*	*Percentage to total.*	*Production.*	*Percentage to total.*	*Production.*	*Percentage to total.*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1 Uttar Pradesh ..	13·73	38·8	16·23	38·0	11·98	32·0	8·40	27·1
2 Maharashtra ..	7·80	22·0	10·42	24·5	10·55	28·3	10·00	32·3
3 Andhra Pradesh ..	2·98	8·4	3·35	7·9	2·67	7·1	3·02	9·7
4 Tamil Nadu ..	2·23	6·3	2·88	6·8	2·99	8·0	2·96	9·6
5 Mysore	1·53	4·5	2·43	5·6	2·05	5·5	2·38	7·6
6 Bihar	3·70	10·4	3·33	7·8	2·93	7·8	1·52	4·9
7 Others	3·35	9·6	4·02	9·4	4·23	11·3	2·72	8·8
Total ..	35·32	100·0	42·66	100·0	37·40	100·0	31·00	100·0

TABLE II.

Sugar Industry in India.

Statement showing figures of number of factories, Cane-crushed, Sugar production and Recovery.

Year.	*Number of factories in operation.*	*Total cane Crushed (·000 tonnes).*	*Total sugar produced (·000 tonnes).*	*Recovery of Sugar Percentage cane.*
(1)	(2)	(3)	(4)	(5)
1950–51 ..	138	11,147	1,134	10·17
1955–56 ..	143	19,241	1,890	9·85
1960–61 ..	174	31,021	3,021	9·74
1965–66 ..	200	36,512	3,541	9·70
1966–67 ..	200	21,637	2,151	9·94
1967–68 ..	200	22,638	2,248	9·92
1668–69 ..	205	37,699	3,559	9·47
1969–70 ..	215	45,672	4,261	9·33
1970–71 ..	216	38,204	3,740	9·78
1971–72 * ..	219	31,000	3,089	10·09

* Estimated.

TABLE III.

Sugar Industry in Tamil Nadu.

Year.	*Number of factoires in operation.*	*Total cane crushed (·000 Ml Tons.)*	*Total sugar produced. (In M. Tons.)*	*Recovery of sugar percentage cane.*	*Tamil Nadu's share in All-India total sugar production in percentage.*
(1)	(2)	(3)	(4)	(5)	(6)
1950–51	2	942	92,342	9·35	8·14
1955–56	4	618	54,737	8·85	2·89
1960–61	8	1,458	1,31,464	9·00	4·35
1965–66	14	2,643	2,23,580	8·46	6·31
1966–67	15	1,943	1,72,855	8·90	8·04
1967–68	15	2,084	1,85,302	8·83	8·24
1968–69	15	4,169	3,29,808	7·95	9·27
1969–70	16	3,656	2,88,759	7·87	6·78
1970–71	15	3,326	2,99,024	8·99	7·99
1971–72 * ..	16	3,300	2,96,000	..	9·58

* Estimated.

TABLE IV.

Statement showing the per-capita consumption of Sugar in kg. in some of the countries in the world during the years from 1965–69.

Country.	*Year.*				
	1965	1966	1967	1968.	1969
United Kingdom ..	53·8	52·6	51·9	61·9	52·9
U.S.A.	47·4	48·2	48·0	49·9	49·5
U.S.S.R.	43·5	43·8	45·9	47·1	45·0
Canada	46·7	46·2	50·1	46·2	50·9
Australia	59·2	58·6	57·7	57·3	55·6
Germany	32·7	31·9	34·4	35·8	37·3
Japan	20·0	20·0	22·2	22·9	25·6
India	5·7*	6·3*	5·0*	4·6*	5·8*
World Average ..	18·3	18·6	18·9	19·4	19·4

* Exclusive of consumption of jaggery and Khandasari.

TABLE V.

Statement showing the quantity of cane crushed by sugar factories in Tamil Nadu, Recovery of Sugar and the average yield of sugar cane and sugar produced for the Sugar years 1965–66 *to* 1970–71.

Year.	*Cane crushed in tonnes.*	*Sugar produced in in tonnes.*	*Recovery of sugar per cent cane.*	*Yield of cane per acre in tonnes.*	*Yiled of sugar per acre in tonnes.*
1965–66	26,42,900	2,23,580	8·46	31·04	2·63
1966–67	19,42,900	1,72,835	8·90	31·65	2·82
1967–68	20,84,000	1,85,302	8·83	30·98	2·74
1968–69	41,69,000	3,31,280	7·95	32·65	2·60
1969–70	36,56,100	2,88,013	7·88	30·60	2·41
1970–71	33,25,600	2,99,024	8·99	30·00	2·69

TABLE VI.

STATEMENT SHOWING THE NUMBER OF DAYS ACTUALLY WORKED AND THE RECOVERY OF SUGAR IN SUGAR FACTORIES IN TAMIL NADU DURING THE YEARS 1965–66 TO 1970–71.

Name of factory.	*Number of days actually worked.*					
	1965–66.	1966–67.	1967–68.	1968–69.	1969–70.	1970–71.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Nellikuppam	239	176	264	279	217	226
Pugalur	244	170	143	284	217	217
Madurai	223	149	155	284	241	167
Cauvery	210	268	213	247	166	248
Thiru Arooran	152	130	102	216	190	174
Ambur	171	145	136	209	186	176
Amaravathi	149	78	94	150	250	165
Maduranthakam	109	108	79	204	208	184
Kothari	158	120	113	243	212	120
Sakthi	260	155	217	292	274	283
South India	163	152	140	307	202	135
Mohanur	159	126	32	214	241	164
Aruna	134	100	93	221	212	195
Alanganallur	1	7	28	219	218	121
Kallakurichi	..	..	58	207	209	161
Palar Sugars	..	..	..	..	13	..

	Recovery sugar per cent cane.					
	1965–66.	1966–67.	1967–68.	1968–69.	1969–70.	1970–71.
	(8)	(9)	(10)	(11)	(12)	(13)
Nellikuppam	8·26	8·82	8·35	7·89	7·65	7·99
Pugalur	8·15	8·74	8·75	8·21	8·28	9·20
Madurai	8·17	9·57	8·98	7·84	7·20	8·84
Cauvery	7·81	8·36	8·46	7·34	7·40	8·49
Thiru Arooran	8·39	8·70	8·66	7·74	7·43	8·76
Ambur	8·25	9·66	10·31	8·47	8·58	9·65
Amaravathi	8·62	8·58	8·55	7·49	8·41	9·42
Maduranthakam	8·67	9·35	9·55	7·75	7·51	8·61
Kothari	8·24	9·07	8·59	7·12	7·43	9·67
Sakthi	8·37	8·60	8·67	8·19	8·68	9·25
South India	8·62	8·85	8·93	7·50	7·03	8·47
Mohanur	9·32	9·41	9·51	9·12	7·96	9·36
Aruna	9·14	9·40	10·12	8·41	8·24	9·27
Alanganallur	4·18	7·20	8·83	7·30	7·32	9·90
Kallakurichi	..	..	10·10	8·97	8·13	9·25
Palar Sugars	..	..	..	..	4·32	..

TABLE VII.

STATEMENT SHOWING THE INSTALLED CAPACITY, CANE CRUSHED AND SUGAR PRODUCED AT THE SUGA FACTORIES IN TAMIL NADU DURING THE YEARS FROM 1965–66 TO 1970–71.

Name of the factory.	*Capacity.*	*Total Cane crushed in thousand tonnes.*					
		1965–66.	1966–67.	1967–68.	1968–69.	1969–70.	1970–71.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Nellikuppam ..	2,500	467·5	360·5	537·8	608·9	466·6	467·7
Pugalur	1,500	273·6	168·5	176·8	400·5	265·6	302·6
Madurai	280	54·2	38·3	40·1	76·4	65·5	49·7
Cauvery	1,000	186·5	255·1	202·1	234·3	154·7	229·06
Thiru Arooran ; ..	1,200	168·8	134·3	107·2	282·5	210·6	195·0
Ambur	2,000	154·7	122·7	114·5	192·2	184·6	224·9
Amaravathi ..	1,250	121·6	57·7	77·4	126·0	221·0	134·6
Maduranthakam ..	1,000	148·1	90·9	65·0	188·7	188·4	174·2
Kothari	1,800	201·7	147·6	156·0	350·7	306·4	190·9
Sakthi	2,000	334·7	158·7	239·7	437·9	400·7	448·3
South India ..	1,500	177·0	177·7	171·9	389·7	272·2	185·4
Mohanur	1,250	178·5	113·6	23·6	244·0	269·9	191·5
Aruna	1,800	128·0	113·2	100·2	266·8	255·5	247·0
Alangana llur ..	1,000	0·4	4·1	16·7	202·8	198·1	116·6
Kallakurichi ..	1,250	..	..	54·5	215·7	206·7	167·8
Palar	..	..	..	..	..	2·5	..
Dharmapuri ..	1,250	..	..	..	..	..	..

	Total sugar produced in thousand tonnes.					
	1965–66.	1966–67.	1967–68.	1968–69.	1969–70.	1970–71.
	(9)	(10)	(11)	(12)	(13)	(14)
Nellikuppam ..	386·0	317·9	449·2	480·6	357·1	373·
Pugalur	222·9	147·3	154·6	328·7	219·9	278·3
Madurai	44·3	36·7	35·9	59·9	47·2	43·9
Cauvery	153·5	212·8	170·9	171·9	114·5	194·3
Thiru Arooran ..	141·6	116·9	192·8	179·8	156·4	171·5
Ambur	143·0	118·5	118·0	162·8	158·5	217·0
Amaravathi ..	104·8	49·4	66·2	94·3	186·0	126·8
Maduranthakam ..	128·4	85·0	62·1	146·3	141·5	150·0
Kotha ri	166·3	133·9	134·0	249·5	227·6	184·7
Sakthi	280·2	136·6	207·7	357·0	347·7	414·6
South India ..	152·5	157·3	153·6	292·1	191·5	156·9
Mohanur	167·0	107·0	23·8	222·7	215·1	179·3
Aruna	117·0	106·4	101·4	226·0	210·7	229·0
Alanganallur ..	0·2	3·0	14·8	148·0	145·0	115·4
Kallakurichi ..	..	..	55·1	193·4	168·1	154·7
Palar	..	..	..	..	1·1	..
Dharmapuri ..	..	..	..	..	..	..

CHAPTER XIV.

Paper.

1. *The present status of the Pulp and Paper Industry in India.*

1.1 There are at present 57 industrial units in India which are engaged in the manufacture of writing and printing paper and the duplex board. There is only one unit in the Public Sector which manufactures newsprint.

1.2 Out of the said 57 units in the country only 16 to 18 units can be considered to be big-sized units, whereas the rest of them are to be considered as either medium or small-scale units.

1.3 The present total production of finished paper can be estimated at 7,58,000 tonnes per annum, consisting of cultural paper and other varieties ; e.g. writing and printing paper (4,50,000 tonnes), packing and wrapping paper (1,61,000 tonnes), special varieties (23,000 to 24,000 tonnes) and Boards (1,30,000 tonnes approximately). As against the said production, the current demand in the country for all varieties put together is estimated at 9,00,000 tonnes.

1.4 There is, thus, already an overall shortfall in the country which is estimated at about 1,42,000 tonnes.

1.5 The shortfall between the demand and supply in the country, as indicated above, is likely to assume acute proportion until the programmes for expansion of the existing big units which are already licensed come to be implemented. It is expected that implementation of the expansion programmes will take at least two to three years from now and, during that period, the demand for paper will continue to grow, resulting inevitably in accentuating the shortfall between demand and supply.

2. *Present status of production and demand for Paper and Paper products in the State of Tamil Nadu.*

2.1 Currently, the State of Tamil Nadu is producing about 42,000 tonnes per annum of finished paper and the industrial units that are contributing to the above production are the following :—

(i) Seshasayee Paper and Boards Ltd., Pallipalayam.	33,000	tonnes (including 7,000 to 10,000 of duplex board).
(ii) Sun Paper Mills Ltd., Tirunelveli.	5,000	tonnes.
(iii) Venkateswara Paper Mills, Udumalpet.	4,000	tonnes.
Total ..	42,000	tonnes.

It is estimated that the *present consumption* of paper boards is as follows :—

	TONNES.
(i) Writing and Printing Paper (including special varieties)	30,000
(ii) Packing and Wrapping Paper ..	10,000
(iii) Paper Boards (Duplex, Triplex and pulp Boards)	10,000
	50,000

2.2 The current shortfall between supply and demand of the different varieties of paper and paper boards within the State is made up from supplies obtained from up-country mills.

2.3 The current per capita consumption of paper on the basis of the population figures pertaining to all-India and to Tamil Nadu which are obtained from the Census records for the years 1961 and 1971 are given hereunder :—

	Population growth.		
	1961	1971	*Percentage increase between* 1961 and 1971.
	(*In millions*).		
All-India	439·072	546·956	24·57
Tamil Nadu	33·687	41·103	22·01

2.4 It may be, perhaps, relevant in this context to state that, while the per capita consumption of paper and paper boards on All-India basis works out to 1·4 kg., the per capita consumption in Tamil Nadu is only 1·2 kg.

3. *Projection of Demand for Paper and Paper Products by* 1983–84.

3.1 It is observed that the rate of population growth during the decade 1961–71 was in the order of 2·46 per cent per annum in All-India and 2·2 per cent per annum in Tamil Nadu.

3.2 We shall assume that the growth rate in population will be slightly reduced as a result of intensive family planning campaign that is being implemented, both at all-India and State levels.

3.3 Accordingly, it is assumed that the annual growth rate of population can be taken at 2 per cent in the next decade as against 2·2 per cent during the last decade, in Tamil Nadu.

3.4. If the above assumption is valid, then, the population of India and Tamil Nadu in 1983–84 can be estimated as follows :—

Estimate of population in 1983–84.

	1971.	1983–84.
	(IN MILLIONS).	
All-India	546·956	685·000
Tamil Nadu	41·103	53·000

3.5 According to the Census Reports from 1961 and 1971, it is observed that while the percentage of literacy on all-India basis is only 29 in 1971, the percentage of literacy in the State of Tamil Nadu is much higher at 39.

3.6 It is estimated that as a result of the sustained drive undertaken by the State Government for promoting compulsory education and growth of literacy, the percentage of literacy by 1983–84 can be safely estimated to reach around 50 per cent, if not more. It will be appreciated that even this percentage may be regarded as a conservative estimate since it assumes the rate of increase in the percentage of literacy at only one per cent per year approximately.

3.7 Simultaneously, the per capita consumption of printing and writing paper may also be expected to increase substantially during the period of next 12 years, reflecting, thereby, an increase in the standard of living of population of Tamil Nadu.

3.8 Concurrently, it is to be assumed that the demand by the Packaging industry which require paper boards, pulp boards and wrapping paper would also grow consistent with the growth in the standard of living of the people of the State and industrial development.

3.9 The consequences of the above factors will be a disproportionate increase in the demand for paper and paper boards ; instead of the demand increasing in *direct proportion* either to the growth of population or to the increase in the percentage of literacy in the State of Tamil Nadu.

3.10 For purposes of this projections, it is assumed that the demand for the different varieties of paper and paper products in 1983-84 may reflect the following pattern :—

Item.	*Demand (Consumption) in* 1983-84.
	TONNES.
Printing and writing paper	80,000
Packing and wrapping paper	40,000
Paper Boards (Duplex, Triplex and Pulp Boards).	45,000
Total ..	165,000

3.11 It will be, thus, observed that the per capita consumption on the above basis in Tamil Nadu in 1983–84 would work out to 3·1 kg. as against the persent per capita consumption of 1·2 kg. In simple average, it would mean that, over the next 12 years, the per capita consumption spread over the three varieties mentioned above may be expected to be more than 2½ times.

3.12 While the present production of all the three varieties is about 42,000 tonnes per annum in Tamil Nadu, the requirement of cultural papers, packing and wrapping paper and paper boards by 1983–84 is estimated to be in the order of 1,65,000 tonnes per annum. In other words, over the coming 12 years, we have to plan for a production of an additional quantity of 123,000 tonnes of the above varieties of paper and boards, the break up of which can be illustrated as follows :

Additional quantity to be produced by 1983–84.

	TONNES.
Printing and writing paper	54,000
Packing and wrapping paper	39,000
Paper Boards	30,000
Total ..	123,000

3.13 Since a Perspective Planning for such a long period as that of 12 years is now attempted, it will be safe to provide for a 5 per cent margin while planning for increased *production capacity* so that the actual production may result in achieving an additional quantity of 130,000 tonnes if our State is to reach self-sufficiency in 1983–84.

3.14 Thus, the provision of 5 per cent margin in capacity, as against actual production, will mean that planning has to be done to achieve an *additional capacity* for producing 130,000 tonnes of paper and paper products at the end of 12 years.

4. *Raw Material requirements.*

4.1 The different raw materials that go into the manufacture of paper are called the ' furnish ' in technical parlance. The ' furnish ' for making paper and paper boards with conventionally designed paper and pulp machinery, as obtained in international market, can be indicated as follows :

Percentage of furnish.

Description.	*Paper.*	*Paper Boards.*
	PER CENT.	PER CENT.
1. Bamboo and reed pulp* (long fibre) ..	50	25
2. Wood pulp (hard or soft) (medium fibre).	40	10

Percentage of furnish.

Description.	*Paper.*	*Paper Boards.*
	PER CENT.	PER CENT.
3. Pulp from bagasse, kenaf, agathi or similar varieties of pulp (i.e., short fibre).	10	5
4. Waste Paper Pulp	..	60
	100	100

* *N.B.*—By international standards, bamboo can be classified only as having medium fibre length. In advanced countries, they use conifers which have really long fibre and impart remarkable tensile strength to the product and that explains the superiority of paper produced notably in Canada, Newfoundland, Sweden and Finland and perhaps U.S.A. also.

4.2 Requirements of raw materials to achieve a production target of 130,000 tonnes per annum over a period of 12 years ending 1983–84.

4.2.1 On the basis of the varying percentages of different items of pulpable wood to produce a satisfactory 'furnish' (as per technology so far developed) the quantities of different pulpable wood that can be used as raw materials to achieve the above physical targets can be estimated as follows :

Requirements of raw materials by 1983–84.

(Adopting the " Furnish " recommended above.)

Description.	*Pulp.*	*Fiber yield.*	*Raw materials required.*		
			Bone dry.	*Moisture.*	*Air Dry.*
(1)	(2)	(3)	(4)	(5)	(6)
	(TONS.)	(PER CENT.)	(TONS.)	(PER CENT.)	(TONS.)
(*a*) Bamboo and Reeds.	57,000	40	1,27,000	15	1,50,000
(*b*) Wood	41,500	45	92,250	30	1,32,000
(*c*) Bagasse, kenaf, Agathi, etc.	11,500	40	28,750	50	58,000
(*d*) Waste Paper Pulp ..	25,000	70	35,750	15	42,000
					3,82,000

4.2.2 From the above tabulation, it will be observed that the total requirements of the different raw materials would be in the order of 3,82,000 tonnes (airdry), or rounding off the figure, the requirements can be taken at 400,000 tonnes per annum consisting of different varieties of raw materials indicated above, by 1983–84.

5. *Recommendations to ensure continuous supply of raw materials to the industry.*

5.1 Once the areas for growing different pulpable wood species are demarcated and earmarked, it is strongly urged that these lands should be granted on long-term lease (say for 50 years or 99 years) to the various industrial units that will have to be set up during the coming period of 12 years so that the actual plantation work can be undertaken by the industrial units concerned.

This suggestion is neither novel nor unconventional. Indeed, in all the advanced countries, raw materials supplies are ensured only by the companies owning the paper and pulp industry either also owning the lands themselves for growing the plantations or taking the said land on long-term lease.

6. *A rough estimate of the capital cost that would be required to establish additional production capacity of* 130,000 *tonnes during the period of* 12 *years.*

6.1 The present day capital cost for establishing a new intergrated pulp and paper mill is estimated at Rs. 6,000 per annual ton. This estimate is based on the assumption that nearly 40 per cent to 45 per cent of items constituting capital expenditure will be imported, while the balance will be procured from indigenous sources.

6.2 Within our country, we should expect an average increase of 10 per cent per annum in the capital cost of machinery and equipment produced indigenously and even this may turn out to be an under-estimate. Assuming that at the end of six years from now, our country will be equipped to supply all machinery and equipment for establishing an integrated pulp and paper mill, it would be realistic to assume that the average capital cost would be in the neighbourhood of Rs. 10,000 per annual tonne over the period of 12 years ending with 1983–84.

6.3 Accordingly, to achieve a physical target of an additional production capacity of 130,000 tonnes per annum by 1983–84, the total capital outlay required will be in the order of Rs. 130 crores.

6.4 The above capital cost does not take into account the cost of raising the plantations and other maintenance for which additional capital resources to be found may be reckoned on an average during the 12 year period at Rs. 350 per acre during the year of plantation and at the rate of Rs. 150 per acre on an average for its upkeep and maintenance. Taking into account the total acreage of plantation required, the total amount required for raising and maintaining the plantation during the 12-year period will be in the order of Rs. 20 crores.

6.5 If, therefore, our State proposes to plan for self-sufficiency in this consumer article, namely, paper, which is important next only to food, then, our State has to ear mark and allocate a sum of Rs. 150 crores for achieving the objective of establishing an additional production capacity of 130,000 tonnes of writing and printing paper, packing and wrapping paper and paper board.

6.6 Some part of the additional capacity can be secured through expansion schemes while at least the new units will have to be established for broadening the base and securing also scope for future units. A cautious effort should be made to use bagasse for writing and printing paper as existing raw material sources in the coming years will present a serious problem due to competing demand from other industries. Bagasse also can be regenerated in large volume because of the rapid growth of the sugar industry. The necessary incentives will have to be provided in order to release bagasse with the use of other form of fuel like coal and furnace oil.

CHAPTER XV.

Alcohol Industry.

1. *Requirements of Alcohol.*

1.1 Tamil Nadu has many small and a few big alcohol-based industries. The biggest alcohol-based industrial unit, Chemicals and Plastics India Limited, at Mettur, is producing polyvinyl chloride and ethylene-di-chloride based on alcohol. Its present requirement is of the order of 2·5 million gallons per annum but this will go up to four million gallons when it expands further its capacity. The next big consumer of alcohol is the Cordite Factory at Aruvankadu which is a defence establishment requiring about 0·5 million gallons annually. Apart from these two units, there are many small industries which are manufacturers of pharmaceuticals, paints and varnishes. Also, the variou hospitals in the State are in need of denatured and methylated spirit. The present annual requirements of these consumers would come to another 0·5 million gallons per annum. The total requirements of alcohol for industrial and hospital uses will therefore be of the order of 5 million gallons per year.

1.2 In addition, on account of the suspension of prohibition in our State, a huge demand has been created for alcohol for potable purposes. At the time of lifting prohibition, it was estimated that the consumption of arrack was of the order of 14 million litres per annum which would need 1·23 million gallons of alcohol. But the trend of actual consumption has proved this to be an under-estimate. For the six months period ending February, 1972 the actual off-take of arrack from E.I.D. Parry and Trichy Distilleries and Chemicals was of the order of 15·5 million litres even with the restricted availability of supplies. Hence, it would be safe to assume that in a full year, subject to availability of alcohol, the consumption of arrack would go upto about 35 million litres which would need about 3 million gallons of alcohol even on the basis of the present population of 411 lakhs. Out of the population 411 lakhs, we may take for the purpose of our estimate, 25 per cent as the adult male population which would come to 103 lakhs. Even assuming a low figure of 3 per cent of the population as addicted to drink, the total population which may consume arrack come to about 3 lakhs. Assuming that the per capita consumption would be 33 litres annually the aggregate consumption would work out to 33 million litres. This very nearly tallies with the earlier estimate of 35 million litres. On this basis, the present total requirements of alcohol both for industrial and potable purposes would come to 8 million gallons per annum against which the two earlier entrants in the field produce 6·5 million gallons.

1.3 In the year 1978–79, the estimated population in the State is expected to be of the order of 47 million and in 1984, 53 million. Applying the same method of assessing the population that may be expected to consume arrack, it would increase to about 3·6 lakhs in 1978–79 and 4 lakhs in 1983–84. Assuming the consumption of arrack will be on the basis indicated above, the total consumption will increase to 39·6 million litres by 1978–79 and to 44 million litres in 1983–84. The requirements of alcohol for arrack production will therefore increase to 4 million gallons in 1978–79 and to 4·4 million gallons in 1983–84. The additional requirements of alcohol for potable purposes would thus be of the order of 1·4 million gallons by 1984, over and above the 3 million gallons now required per annum.

1.4 The actual need in the base period however has been estimated on a conservative basis as illicit distillation has not been completely eliminated and the sales may increase by even 50 per cent with lower prices and a change in the methods of marketing. An expert assessment has even placed the potential at the equivalent of $4\frac{1}{2}$ million gallons which will mean that aggregate demand by 1983-84 can even be 6 million gallons and more if there was an increase in the per capita consumption by 20 per cent which is not unlikely.

1.5 The industrial demand will have to be conciously stimulated with the manufacture of alcohol based chemicals like acitate flakes anhydride and other products which are required in the production of plastic compounds, photo films and other items. There will also be an increase in the manufacture of pharmaceutical and paint units and hospital clinics and other establishments.

The demand from the latter group may be expected to double in the plan period while industrial units in Kerala and elsewhere, which may not be in a position to secure the required quantities in their own regions, will have to obtain their requirements from better placed regions like Tamil Nadu. It will not be incorrect therefore to expect that there will be a doubling of the existing level of consumption to 10 million gallons by 1983–84 taking the total needs of all consumers to nearly 18 million gallons by the end of the 6th plan period.

2. The capacity for producing alcohol in the middle of 1972 was 283 lakh litres annually in respect of 2 big sized and 2 medium sized distilleries. Trichy Distillieries and Chemicals has a capcity of 135 lakh litres, Sakthi Sugars 90 lakh litres, E.I.D. Parry 45 lakh litres and Arvind Distilleries 30 lakh litres giving an output of nearly 13 million gallons annually. The consumption of alcohol for industrial and potable purposes in 1972–73 may be 9 million gallons with 3 small sized distilleries capable of producing 27 lakh litres. The availability will increase to 14·2 million gallons. If an operating ratio of 80 per cent is assumed, the actual production may be 11·3 million gallons. The ancticipated increase in consumption may, therefore, be met even by the existing new units though with a good demand from the neighbouring states as well as for export there will have to be advance planning. As it will be necessary to have a capacity of 18 million gallons for meeting the anticipated demand of around 15 million gallons by 1983–84, 3 or 4 new units will have to be started apart from a few small units. The earlier smaller units may also be encouraged to expand the capacity as the optimum size will be 60 lakh litres. There will be no problem of availability of molasses as sugar production is expected to reach 1·1 million tonnes by the end of the sixth plan which would be accompanied by an output of molasses of nearly 5 lakh tonnes. With this quantity 20 million gallons of alcohol can be easily produced and even 25 million gallons if there could be better storage facility for molasses and more efficient distillation. The outlay involved in the erection of three new distilleries and the expansion of smaller units may not be more than Rs. 5 crores.

3. Efforts should neverthless be taken to increase the per-tonne yield of alcohol to 250 lit es per tonne of molasses as against the existing yield which is slighltly less than 200 litres, by providing for improved storage and improving distillation and fermentation efficiency. With this end in view, a small cell could be set up comprising of experts in the field who will be continuously keeping a vigil over the performance of the distilleries and suggest suitable remedial measures to improve efficiency.

CHAPTER XVI.

Vanaspathi Industry.

1. The scope for expanding the Vanaspathi Industry is rather limited in the next 10 years. This is particularly because of the fact that its All-India licenced capacity is around 18 lakh tonnes of which the current production is only one-third. In other words the capacity of the Vanaspathi Industry appears to be far in excess of the production requirements. What is more, in the Southern Zone, the demand for the product is much less than its demand in other zones, and as such the Task Force recommends that no priority need be given for further development of this industry in Tamil Nadu.

2. The following table indicates the All-India production of Vanaspathi during 1971 in relation to the South Zone including Tamil Nadu :—

	Production (IN TONNES).		
	Bulk.	*Small.*	*Total.*
All-India Total	482,431	92,304	5,74,735
South Zone Total	46,776	6,187	52,963

2.1 It is observed from the above table that the South Zone total production is less than 10 per cent of the All-India figure. The All-India licenced capacity is around 18 lakh tonnes and the production is only one-third of this figure. In short, the capacity of the Vanaspathi industry is far in excess of the requirements at this stage ; that too in the South Zone the requirement is much less. In the Northern region, the consumption of Vanaspathi seems to be higher than Southern Region.

3. In the South Zone we have several industries producing Vanaspathi. Their names, production and despatches State-wise are tabulated below :—

	Production.			*Despatches.*				
	Bulk.	*Small.*	*Total.*	*A.P.*	*T. Nad.*	*Mys.*	*Ker.*	*Def.*
Aryan	4,509	300	4,809	2,657	149	165	..	..
Thungabhadra	..	..	..	..	..	..	..	..
Kurnool	13,040	256	13,296	1,410	1,784	1,295	200	6,298
Hyderabad Vanaspathi	4,624	49	4,673	1,158	108	279	..	..
Radhakrishna	998	..	998	60	5	541	..	..
Tatas, Ernakulam	714	317	1031	..	..	158	887	..
Tatas, Madras	5,996	109	6,105	799	3,893	897	82	..
BT. Davangere	194	7	201	..	23	419	..	..
BT. Madras	1,760	..	1,760	210	1,289	240	..	..
H.L.L. Tiruchi	3,620	5,057	8,677	1,684	3,805	1,882	1,159	..
Mettur Chemicals	2,090	..	2,090	..	1,873	138	1	..
Madras Vanaspathi	719	..	719	39	565	33	16	..

	Production.			Despatches.				
	Bulk.	*Small.*	*Total.*	*A.P.*	*T. Nad.*	*Mys.*	*Ker.*	*Def.*
T.G.L., Adoni	2,486	15	2,501	372	357	143	3	..
Marg. Industries	530	11	541	4	14	518	..	..
Mysore Vegetables	561	1	562	4	29	514	..	..
Ravi "D'gere	2,972	62	3,034	232	627	1,506	155	..
Sundatta	960	3	963	..	..	752	84	..
Rajendra	1,003	..	1,003	414	..	63	..	..
			52,963					

3.1 All the production of the South Zone is not consumed and they export about 9,987 tonnes to other States and supply about 6,298 tonnes for Defence. In other words, from the total production of 52963 tonnes, about 16,285 tonnes are sold to outsiders and the balance of 36678 tonnes is consumed in Andhra, Tamil Nadu, Mysore and Kerala as follows :

Andhra	9,711	tonnes.
Mysore	9,612	,,
Tamil Nadu	14,730	,,
Kerala	2,625	,,

3.2 The capacity in the southern region is less than 10 per cent of All-India capacity while normally in respect of essential articles of consumption there should be development which will be helpful not only in processing the large quantities of oil seeds producing in the region particularly in Andhra Pradesh and Tamil Nadu ; but by some accident and the greater preference even now being shown by the region's population for raw oil, instead of hydro-genated products, the bulk of the capacity for hydro-genation is located in other regions. In view, however, of an unsatisfactory demand for edible oil and a high rate of consumption, the unused capacity of the industry may be fully activised in the next 7 years. Thereafter, however, there may not only be a much higher aggregate demand for edible oils but it may also happen that the greater proportion of the output of edible oil will be in the form of Vanaspathi. At that stage it would be necessary for Tamil Nadu to install additional capacity for Vanaspathi and export it after utilising its surplus in groundnut oil. There may also be larger consumption within the region itself and if there was a doubling of the standard of living as is now proposed, there will have to be a four fold or five fold increase in the consumption of edible oils. This should also postulate the need for a big increase in the area under groundnut and also the yield per acre. The development of the oil processing and other industries is therefore dependent on the trend of events in the Fifth Plan period, and appropriate action will have to be initiated at the right time.

CHAPTER XVII.

Rice Milling Industry.

1.1 Rice Milling Industry is one of the largest agro-based industries in India. There are about 67,100 rice mills in the country out of which Tamil Nadu alone accounts for about 12,000 units, the largest concentration in any single State. This pre-eminent position of the industry is on account of the fact that India is the largest rice growing country in the World, having about 37 million hectares under the paddy crop. In regard to total paddy production, India ranks second, producing 60 million tonnes of paddy as against 91 million tonnes in China and 284 million tonnes in the World. The monetary value of rice is of the order of Rs. 40,000 million. As against this all India picture, Tamil Nadu raised paddy in about 2·7 million hectares, i.e. about 7·2 per cent of the total area sown in India and produces about 5·3 million tonnes of rice which works out to 12·5 per cent of the aggregate for the country.

1.2 Tamil Nadu ranks second in the production of rice with 12·5 per cent next only to West Bengal which produces 14·4 per cent. But the State is able to produce 12·5 per cent of the total output of All-India from only 7·2 per cent of the total area under paddy in the country whereas West Bengal is able to produce 14·4 per cent of the total production of rice from about 13·2 per cent of the total. Tamil Nadu is accounting for 12·5 per cent of the total production from 7·6 per cent of the total acreage while Andhra Pradesh shares are 11 per cent and 9·1 per cent respectively.

1.3 In Tamil Nadu, paddy is a major crop which occupies about 2·7 million hectares producing about 5·3 million tonnes. Out of 27 lack hectares in Tamil Nadu, nearly 6·5 hectares are in Thanjavur district which works out to nearly 25 percent of the total extent of land under paddy cultivation in the State. Chingleput and South Arcot put together have an extent of about 6·5 lack acres, again forming nearly 25 per cent of the extent under paddy in the State. The other important areas under paddy cultivation are North Arcot, Tiruchirappalli and Ramanathapuram, each one with about 2·5 lack acres.

1.4 In the processing of paddy, such by-products as broken rice, bran and husk can be secured. Depending upon the type of rice mill machinery used and the variety of paddy milled, broken rice can be got from a minimum of 5 per cent of about 20 per cent of the rice produced. As far as bran is concerned it will be about 5 per cent of the total weight of paddy milled. The husk content in paddy would vary between 18 to 20 per cent of the weight of paddy depending on the variety.

1.5 Out of a total number of 67,100 mills of various types about 11,416 are situated in Tamil Nadu forming about 16 per cent of the total in the country. It is seen that in the adjoining state of Andhra Pradesh out of the total-number of 8,709 units, about 3,348 units are sheller-*cum*-hullers and shellers whereas in Tamil Nadu, out of 11,416 units, only 427 units are shellers and sheller-*cum*-hullers.

587c–59—20

1.6 The number of rice mills and type of rice mills in each district in existence in the State as at the end of 1971 reveal that out of nearly 12,484 units working, about 12,369 units are hullers, 19 are shellers and 96 are sheller-*cum*-hullers. Out of the total number of nearly 12,484 units, over 2,000 units are located in Thanjavur District, about 2,200 units in Chingleput and South Arcot Districts, over 1,600 units in North Arcot and about 1,117 in Tiruchirappalli. In view of the fact that over 90 per cent of the units are huller mills, the quality of the bran produced is very inferior. Out of a total of 67,100 processing units in the country, about 59,400 units are of metallic hullers and only about 7,700 are shellers or sheller-*cum*-hullers. Both in Tamil Nadu as well as in All-India, the industry consists of far too many small units which are quite unproductive. The average milling yield from paddy obtained in the conventional type of sheller-*cum*-polisher mills, varies from 62 per. cent to 68 per cent while in the huller type mills the yield goes down to about 57 to 63 per cent.

1·7. On the recommendations of the Ford Foundation, the Government of India had taken positive steps for the estabilshments of Modern Rice Mills in the various parts of the Country. The first important step was to install 6 pilot units of Modern Rice Mills of different capacities from different manufacturers in 6 different States in the country. An Evaluation Committee set up by the Government of India have found that not only the quality of rice and the by-products from the Modern Rice Mills is superior to that produced by the huller mills; but the milling yield is about 5 percent higher than the huller mills and about 1 percent to 2 per cent higher than the sheller mills. In view of the report of the Evaluation Committee, the Government of India have recommended to the State Governments that no new licences should be issued for the exstablishment of huller mills and that it is desirable to convert the existing huller mills into sheller mills with polishing cones. The Government of Tamil Nadu have taken a lead over the other States in the establishment of maximum of Modern Rice Mills where 13 uuits have already been established in addition to the pilot unit. The Food Corporation of India has also installed four units in the State. Since nearly over 90 per cent of the mills belong to the huller type, the Government have taken a decision that the new mills to be licenced should be only sheller mills with polishing cones and even the existing huller mills will have to be converted into sheller mills with polishing cones within the next 5 to 10 years. The Government may consider the question of financing the conversion of these units into shellers by the grant of loan on easy terms repayable over a period of 10 years. Modernising all the existing rice mills would involve the installation of paddy cleaners, a rubber coil sheller or under-runner disc sheller with husk separators and paddy separators and cone polishers. In Tamil Nadu, Binny & Co., has collaboration with Stake Engineering Co. of Japan for manufacturing these types equipment. Similarly,in Maharashtra Kirloskars have collaboration with Schule of West Germany for the manufacturing of these equipments. Arrangements could be made with these manufacturers for supplying modern rice mill machinery of different capacities suited to the requirements of the existing millers. A team of experts may be appointed to survey the existing rice mills in all the districts to find out the extent to which equipment for the modernisation of these mills will be required . On the basis of this survey, it would be possible to arrange with the manufacturers for delivery of machines at a reasonable price. For replacing the existing small hullers, compact sheller-*cum*-polisher units manufactured in Japan could be adopted and with a proto-type, got from Japan it should be possible to manufacture them in Madras at Binny & Co., who already possess a Japanase colloboration.

2. *By-Products.*

2·1. Bran is the most valuable by-product and is produced in a quantity equivalent to five per cent of the weight of paddy. Bran has a number of economic uses such as poultry and cattle feed. But the use of highest economic value has proved to be that of solvent oil extraction for production of either edible or non-edible oil for industrial purposes. Eventhough there is a very large potential for extratcion of oil in India, to the extent of over 3,40,000 tonnes, this sources has not yet been tapped fully and only 18,000 tonnes of oil are being produced. Japan has extracted 91,000 tonnes of oill out of its potential of 1,97,000 tonnes. In the last three years, only one Solvent Extraction Unit was estabilshed and that was done by the Thanjavur Co-operative Marketing Federation at Thiruvarur which is producing in-edible oil for industrial purposes. The scope for the extraction of oil from bran is very great in Tamil Nadu. The output of over 5·3 million tonnes of rice would give an yield of 4 lakh tonnes of oil worth about Rs. 100 crores.

2·2. In the next ten years with the extension of the Intensive Agricultural District Programme in all the districts in the State, it could be expected that substantial increases in paddy production requiring new milling capacity will be called for. Even if 50 per cent of the paddy produced in the state should get milled with modern machineries, and good quality of bran could be produced, oil worth about Rs. 15 crores, which would help in reducing the present import of oil from foreign countries, could be produced. India in general, and Tamil Nadu in particular, are short of oil, both for industrial purposes and edible purposes. It is possible to produce edible oil from rice bran. In Japan out of a total of 91,000 tonnes of oil produced, 59,100 tonnes of edible oil is manufactured from rice bran.

2·3. Out of the total of nine Modern Rice Mills, eight are of the capacity of four tonnes of paddy per hour and one is of the capacity of two tonnes of paddy per hour. On the basis of 300 working days of 22 hours per day, these mills could process 2,24,004 tonnes of paddy producing about 11,220 tonnes of good quality bran which could yield about 2,250 tonnes of oil worth about Rs.56 lakhs apart from producing about 9,000 tonnes of good quality deoiled bran worth about Rs. 18 lakhs. If only all the rice mills in Thanjavur district could be modernised, it would be possible to produce oil and deoiled bran worth about Rs. 4 crores. But if we could put up continuous Solvent Extraction Plants and make edible oil, it is possible to extract an addtional Rs. 1,000 per tonne of oil produced.

3. *Broken Rice.*

3.1. Another valuable by-product is broken rice which constitute about 15 per cent of the rice produced in the State. This would mean that a quantity of about eightlac tonnes is available. In Japan, they are producing many beverages out of the rice like Sake, beer and "Shochu" (a drink like dry-gin). Since in this State the prohibition has been suspended, the manufacture of gin from broken rice could be thought of in Thanjavur District.

587C–59—20A

4. *The Perspective.*—The problem of modernisation and replacement of the existing rice mills has to be scientifically takled and as stated earlier an expert group must conduct a survey of the working of the existing units in different districts and determine how this modernisation programme should be implemented. It may even be necessary to replace many old huller units not only for improving the quality of rice mill but also effecting a substantial saving in the yield. It has even been suggested that there is a loss of production by over two per cent in the aggregate which would mean an increase in the net output by nearly $1\frac{1}{2}$ lakh tonnes of rice having a value of even Rs. 15 crores. The pro portion of broken rice can be substantially reduced enabiling a higher value to be realised. The cost of modernisation programme which will in effect mean the replacement of old units with new units may ultimately cost Rs. 20 crores. It will thus be seen that the modernisation scheme will bring substantial benefit to the region and the State Government will do well to complete the installation of new units on a priorty basis as even if half the units could be replaced in three or four years, the expenditure would have been recovered in the next two years with a higher yield. The rice milling industry would then have grown considerably in stature.

TABLE—I.

Relative share of important states in the area and production of rice in India during 1970—71.

State.	*Area in thousand Hectares.*	*Percentage to the total of India.*	*Porduction in thousand tonnes.*	*Percentage of the total . of India*
(1)	(2)	(3)	(4)	(5)
1. Andhra Pradesh	3,395.7	9.1	4,650·1	11.0
2. Assam	2,000.8	5.3	2,016.4	4·7
3. Bihar	5,232.2	14.0	4,539.0	10.7
4. Kerala	874·8	2.3	1,271.1	3.0
5. Madhya Pradesh	4,333.7	11.6	3,646.8	8.6
6. Maharashtra	1,355.8	3.6	1,662.9	3.9
7. Mysore	1,159.8	3.1	1,952.9	4.6
8. Orissa	4,566.0	12.2	4,383.0	10.3
9. Tamil Nadu	2,686.2	7.2	5,303.4	12·5
10. Uttar Pradesh	4,553.0	12.2	3,729.3	8.8
11. West Bengal	4,949.1	13.2	6,104.7	14.4
12. Others	2,324.9	6.2	3,188.6	7.5
Total.	37,432·0	100·0	42,448·2	100·0

Directorate of Economics and Statistics, Ministry of Agriculture, New Delhi.

TABLE—II.

Statement showing the number of various types of Rice Mills in India.

Serial number and name of the State Territory.	*Single hullers.*	*Batteries of hullers.*	*Sheller cum hullers.*	*Sheller.*
(1)	(2)	(3)	(4)	(5)
1. Andhra Pradesh	5,332	29	3,032	316
2. Assam	469	..	412	10
3. A and N Islands	95	..	3	..
4. Bihar	1,839	181	3	2
5. Chandiragh	19	..	..	1
6. Dadra and Nagar Haveli	14	..	4	..
7. Delhi	40	..	..	..
8. Gujarat	2,641	27	169	242
9. Goa, Damman and Diu	396	14	8	..
10. Haryana	1,447	110	36	121
11. Himachal Pradesh	763	..	..	..
12. Jammu and Kashmir	1,810	..	..	27
13. Kerala	3,861	11	4	35
14. Madhya Pradesh	3,502	250	275	195
15. Maharashtra	3,075	..	444	321
16. Mysore	5,289	..	212	671
17. Manipur	59	3	27	..
18. Nagaland	..	..	..	124
19. Orissa	2,388	206	169	1
20. Punjab	2,435	108	22	192
21. Pondicherry, Karaikal, Mahe, Yenam ..	184	..	..	..
22. Rajasthan	344	..	40	15
23. Tamil Nadu	11,207	96	92	21
24. Tripura	146	..	4	..
25. Uttar Pradesh	4,017	228	171	256
26. West Bengal	6,133	661	37	18
Total ..	57,505	1·924	5,164	2,566

Source :—Government of India Report.

TABLE—III

Area, total production and average yield per hectare of rice in Tamil Nadu.

Year.	*Area (thousand hectare).*	*Production (thousand (tonnes).*	*Yield per hectare in Kg.*
(1)	(2)	(3)	(4)
1950–51	1,740	1,931	1,139
1951–52	1,789	2,129	1,190
1952–53	1,744	2,021	1,159
1953–54	2,081	2,580	1,240
1954–55	2,159	2,797	1,296
1955–56	2,208	3,002	1,360
1956–57	2,316	3,247	1,602
1957–58	2,266	3,288	1,450
1958–59	2,273	3,134	1,380
1959–60	2,315	3,333	1,439
1960–61	2,518	3,559	1,413
1961–62	2,538	3,907	1,540
1962–63	2,666	4,024	1,510
1963–64	2,619	3,876	1,480
1964–65	2,626	4,036	1,537
1965–66	2,502	3,524	1,409
1966–67	2,689	3,791	1,410
1967–68	2,660	3,846	1,446
1968–69	2,373	3,659	1,542
1969–70	2,695	4,532	1,682

Note : Figures for 1968-69 and 1969-70 are according to final forecast reports and are subjected to revision.

TABLE—IV.

Area under Paddy and Production.

Serial number and districts.	1968–69.		1969–70.		1969–70.
	Area (Hectares).	*Production (M.T.).*	*Area (Hectares).*	*Production (M.T.).*	*Yield Per hectares in Kgs.*
(1)	(2)	(3)	(4)	(5)	6)
1. Chingleput	3,10,000	3,41,000	3,42,000	4,99,300	1,460
2. South Arcot	3,00,400	4,56,600	3,16,000	5,84,600	1,850
3. North Arcot	2,66,000	3,35,200	2,80,000	4,14,400	1,480
4. Salem	66,900	1,18,400	85,000	1,58,100	1,860
5. Dharmapuri	40,500	60,800	49,000	80,900	1,651
6. Coimbatore	98,500	1,77,300	1,01,000	2,32,300	2,300
7. Trichirappalli	2,33,000	3,72,800	2,36,000	4,13,000	1,750
8. Thanjavur	6,46,200	12,01,900	6,47,500	12,04,400	1,860
9. Madurai	1,47,400	2,43,200	1,61,000	2,76,900	1,720
10. Ramanathapuram	2,40,030	2,16,300	2,65,000	2,59,700	980
11. Tirunelveli	1,50,000	2,70,000	1,52,000	2,88,800	1,900
12. Nilgiris	3,800	3,800	3,200	4,800	1,500
13. Kanayakumari	56,600	1,18,900	57,500	1,15,000	2,000
Total	25,59,600	39,16,200	26,95,200	45,32,200	1,682

TABLE—V.

Rice mills of different types in Tamil Nadu as at end of 1971.

	Huller.	*Sheller.*	*Sheller-cum-Huller.*	*Total.*
(1)	(2)	(3)	(4)	(5)
1. Madras	51	1	5	57
2. Chingleput	1,228	9	8	1,245
3. South Arcot	986	1	1	988
4. North Arcot	1,629	1	1	1,631
5. Salem	1,070	..	..	1,070
6. Dharmapuri	503	..	..	503
7. Coimbatore	1,071	1	..	1,072
8. The Nilgiris	8	..	..	8
9. Thanjavur	2,003	4	11	2,018
10. Tiruchirappalli	1,052	1	64	1,117
11. Madurai	849	1	..	850
12. Ramanathapuram	763	..	2	765
13. Tiruneveli	868	..	4	872
14. Kanyakumari	288	..	..	288
Total	12,369	19	96	12,484

TABLE—VI.

Potential and Actual Production of Rice-Bran Oil in different countries.

Country.	*Production of paddy (1,000 tons).**	*Bran.*	*Bran Availability (1000 tons).†*	*Potential of crude oil (metric tons).&*	*Production of rice bran oil (1968-69) § Crude Edible*	*Industrial (metric tons).*	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		PER CENT.					
Ceylon	1,147	4	46	6,900	..	..	..
China (Taiwan)	3,162	7	221	33,150	887	388	499
India	56,787	4	2,271	340,650	18,000	..	18,000
Indonesia	14,800	4	592	88,800	..	..	..
Japan	18,770	7	1,314	197,100	91,000	59,100	31,900
Korea	4,869	7	341	51,150	5,700	2,900	2,800
Pakistan	19,005	4	760	114,000	..	..	..
Phillippines	4,363	7	305	45,750	..	..	..
Thailand	9,595	7	672	100,800	8,400	7,000	1,400

* Source : Asian Economic Statistics, Vol. XIX No. 4 March 1969, reprint from the Economic Bulletin for Asia and the Far East.

† Bran availability is assumed to be 4 per cent or 7 per cent of paddy, as shown in the table, after taking into account the milling practices adopted in these countries.

& The potential of crude oil is calculated at 15 per cent yield of oil, from the bran, on an average, for all the countries.

§ Obtained from the country reports. It is to be assumed that the actual availability of refined oil will be reduced to the extent of the refining losses.

CHAPTER XVIII.

Fruit Processing.

1. *Introduction.*

1.1 India produces a wide range of varieties of fruits and vegetables, both tropical and temperate, annual production being estimated at 20 millian tonnes. The export of fresh fruits and vegetables (1967–68) amounting to 109,932 tonnes (Rs. 48·8 M * representing a very small proportion to the total production in the country. In the above figures Onion alone accounts for 93 per cent of the total export, mainly to South-East Asian markets. Next in importance are bananas (2,813 tonnes), mangoes (1,072 tonnes) and potatoes (547 tonnes). The total production of processed fruits and vegetables amount to 47,180 tonnes of which 6,189 tonnes (Rs. 18·4 M) alone were exported in 1967–68, consisting of 3,300 tonnes of mango juice (2,000 tonnes to U.S.S.R. and 1,000 tonnes to Kuwait) worth Rs. 7·9 M mango pickles and chutneys 1,379 tonnes (Rs. 4·1 M) and dried mushroom (Rs. 2·2 M).

2. *Tamil Nadu.*

2.1 Tamil Nadu is in an enviable position as it is endowed with varied climatic conditions, soil and irrigation, whereby all kinds of fruits and vegetables can be grown. For the prosperity and uplift of the nutritive standards of the State, Horticulture and fruit processing have a great role to play. In Tamil Nadu the industry has not grown adequately even though it has vast potentialities in the region. The State has wide scope for the development of fruit processing units on healthy lines. While Kanyakumari district is an ideal area for the development of processing units based on the growth of plantations for mangoes and pineapples, units for processing Bananas and Grapes can be established in areas around Tuticorin and Madurai. Emphasis has to be on the development of such varieties which would lend themselves for export . What is required is a planned approach to the problem as this is an area of industrial development which is yet to be exploited.

2.2 The output of processing fruits and vegetables by large, small and cottage scale sectors in Tamil Nadu is given below :—

	Number of Units.	*Quantity in tonnes.*	*Value in thousand rupees.*
(1)	(2)	(3)	(4)
Large Scale	8	1,451	2,401
Small Scale	9	335	670
Cottage Scale	126	840	1,579
Total ..	143	2,626	4,650

* Millian.

Large Scale units of processing in Tamil Nadu are meagre in number when compared to 946 large units throughout India. Even these units have been located only in the cities and towns and not centred round the fruit growing areas.

1·3 The output of processed fruits and vegetables in Tamil Nadu is given below : —

Products.	*Quantity in tonnes.*	*Value in thousand rupees.*
(1)	(2)	(3)
Canned Fruits	22	84
Canned Vegetables	5	5
Jams, Jellies and Marmalades	84	201
Juices and Pulps	56	160
Preserves	Neg.	1
Chutneys	3	20
Pickles	255	858
Tomato Products	6	27
Fruit Beverages	670	1,121
Dehydrated Vegetables	7	87
Others	4	18
Synthetic Products	1,514	2,076
Total	2,626	4,658

3. *Pine Apple.*

3.1 Production of Pine Apple in India is estimated at 76,000 tonnes from a total area of about 10,000 acres consisting of 6,000 acres in Assam, 1,500 acres in Tamil Nadu, 1,000 acres in Andhra, 1,000 acres in West Bengal, 500 acres in Tripura and 400 acres in Mysore and Kerala. In Tamil Nadu it is mostly grown in mixed plantations in lower Palani Hills, Kolli Hills (Salem District) and in the hill ranges of Kanyakumari district.

3.2 *Varieties.*—Kew Queen and Mauritius are the major varieties grown in India. Kew is believed to be a hybrid of smooth cayenee. The varietal preference in the pine apple belt of the globe is clearly towards the increased use of cayenee (OR) Kew.

3.3 *Yield.*—Average yield in India is about 10–12 tonnes per hectare as against 60—70 tonnes obtained in Hawai. Experiments conducted at fruit Research Stations in Mysore and Kerala have indicated through the adoption of close bed system of planting suckers (40,000 per hectare) the yield can be increased to 20 to 30 tonnes per hectare.

3.4 In India, there is no pineapple production on plantation scale worth the name, except in isolated spots in Kerala and Assam. In advanced countries, the production of processing is regulated and mechanisation adopted extensively. The present production cost is estimated at Rs. 200 per tonne of fruit in India compared to Rs. 110 per tonne in Ivory Coast and Rs. 95 in Phillippine.

4. *Prospects of Tamil Nadu.*

4.1 As enumerated earlier, the area at present in pineapple is insignificant. Besides, it is grown as a mixed crop in plantations. An attempt was made recently to introduce pineapples to Kolli Hills of Salem District under the Tribal Welfare Scheme, resulting in establishing a sizeable area of about 400 acres. This item thrives well in humid tropics. The hill ranges of Tamil Nadu, viz., Sevroys, Kalroyans of Salem, Javad Hills of North Arcot district, Pachaimalai of Tiruchirappalli, Lower Palani, Sirumalai and Bodi Hills of Madurai, Anamalais of Coimbatore, Singapattu and Papanasam Hills of Tirunelveli and hill ranges of Kanyakumari are the potential areas where the crop can be grown successfully. A scheme for the development of hill ranges of Tamil Nadu is under the consideration of Government which includes establishment of processing units.

5. The following are the suggestions for building up a sound pineapple industry in this State :—

(1) Select and grow varieties suitable for canning.

(2) Ensure availability of produce right through the year by use of growth regulators.

(3) Intensive and extensive cultivation in selected areas.

(4) Companion cropping with coconuts, arecanuts, etc.

(5) Adoption and enforcement of standards in products in part with international standards.

(6) Setting up of processing units of economic size in suitable location.

(7) Aggressive publicity and promotion for canned products in potential markets.

(8) Tie-up arrangements with leading distributors abroad under whose lable the product can be offered.

(9) Entering agreement with foreign processors under which pineapple juice concentrates can be exported from India for reconstitution at the other end.

(10) Exchange of technical personnel with countries which have developed pineapple industry.

(11) Deputation of technical team to spot study the various aspects of pineapple industry in advanced countries.

(12) Provision of subsidy for sugar and container.

(13) Exemption from ceiling in agro-based industry.

(14) Intensive research programme to provide the technical know-how.

6. *Bananas.*

6.1 India is the third largest producer of bananas having a fairly high yield per acre. About 800 tonnes in 1966–67 and 2,900 tonnes in 1967–68 were exported. During 1967–68 due to closure of Suez Canal, exports could not be effected to U.S.S.R. a major market for Indian Bananas.

6.2 Considering the existing potential of increased production in India and the increasing demand by the imported countries, it has been estimated to increase the present level of export of 8,000 to 100,000 tonnes by 1975–76. Japan alone can import 50,000 tonnes while West Europe 20,000 tonnes, U.S.S.R., 15,000 tonnes, Yugoslavia 8,000 tonnes and Gulf Countries 7,000 tonnes.

7. *Recommendations.*

(1) Production of the varities suitable for export trade in selected areas very near ports., viz., Tuticorin, Madras in Tamil Nadu.

(2) A seperate organisation to provide grading, packaging, handling, transport and storage—preferably the Banana Develpoment Board.

(3) The above Board should form growers co-operatives and enter into agreement for supply of quality bunches at a fair price to the Board.

(4) The Board should provide the technical know-how and credit facilities to the growers as is being done in sugar factories.

(5) The board should provide at the shipping centres storage (refrigerated) facilities for stocking the produce prior to shipment.

(6) A technical team from the Board should undertake immediately a study tour to the leading Banana exporting countries for a detailed study from production to to marketing.

(7) Chartering banana boats on a long term basis to keep up the delivery schedules is essential for regular delivery as well as to achieve economy in Ocean freight charges.

(8) The international standards are to be adhered to strictly and educate the growers to achieve the standards.

(9) The exisiting research organisations such as Department of Agriculture, Tamil Nadu Agricultural University, Central Food Technological Research Institute, Mysore, should undertake separate research projects oriented towards export trade in close collaboration with the Banana Development Board.

(10) There are at present four organisations connected with the Banana Industry, viz., (*a*) State Trading Corporation, (*b*) Banana Fruit and Development Corporation, (*c*) Gujarat State Fruits and Vegetable Marketing Federation, (*d*) Jalagon Banana Co-operative Marketing Federation. The leading states producing bananas should form separate boards entirely for bananas and these boards can operate under a federation of all-India basis. Such a step would ultimately place the industry on a very sound footing.

(11) The tropical belt has the monopoly for bananas necessitating complete dependence on them by temperate zones. So far Gros Michel and Cavendish bananas alone have been placed for consumer's preference in importing countries and no opportunity has been provided for other varieties of bananas grown in this country. Periodical

trial consignments of other popular varieties such as Poovan, Rasthali, Hill Bananas, Red Bananas, Ney Poovan, etc., are to be sent to important cities aboard for testing consumers' preference.

(12) Past shipments to Japan, Italy, etc., were not entirely satisfactory due to discolouration of fruits, stem rots in hands, un-uniform bunches with spreading fingers, etc. All these indicate that the international standards were not maintained. These require to be adhered to strictly from the stage of production till it reaches the consumer.

(13) Among the banana products, banana powder and paper from banana waste are two important commercial items. A factory in Jalagon has been recently established for production of banana powder and is yet to produce on a commercial basis. West Germany and Japan are reported to be the potential market for banana powder which requires to be exploited. It is reported in Costa Rica, quality paper is manufactured from banana wastes and potash is a by-product. Establishment of such a unit in selected areas will go a long way in establishing the banana industry on sound lines.

8. *Mangoes.*

India is the largest producer of mangoes, accounting for 7·5 million tonnes against the world output of 9·5 million tonnes. Other producing countries are Pakistan, Phillippines, South Africa, United Arab Republic and Cuba. There are innumerable varieties and in India alone over 1,000 varieties, mostly non-descript. The harvest in India extents from March to September, similar to Thailand and Phillippines, South Africa from February to April, Egypt July to September and Malayasia from September to February. Mangoes are available round the year in one part of the world or other. Kanyakumari in Tamil Nadu produces mangoes round the year.

9. *Prospects.*

The reason for extremely limited volume of international trade in mangoes is attributed to lack of knowledge about the usage among European consumers. The demand is expected to go as high as 5,000 tonnes in the next decade in Europe alone and India can secure a sizeable share. The acknowledged superiority of Indian mangoes in quality and the sizeable population of Indian orig'n in South East Asia are favourable factors.

10. *Recommendations.*

1 Quality fruit alone should be exported. Bright yellow colour is preferred in European market.

2 Individual packing with tissue paper and a dozen fruits should go in cardboard cartons.

3 Adequate publicity.

4 Alphonso (Khader or Gundu) is the best known varieties outside India Consumer surveys for other commercial varieties to be conducted in commercial centres.

5 Exploitation of Kanyakumari and other off-season bearing areas to produce and supply mangoes round the year.

6. Future development of mango areas to be oriented with varieties suitable for export and canning.

11. *Mango Products.*

Current world output is estimated at 15,000 tonnes, India being the largest producer, accounting for 11,000 tonnes, U.A.R. produces mostly mango nectar (2,000 tonnes). India is the largest exporter (5,000 tonnes) mostly pickles, chutneys and nector. U.K. is the largest market for India, while U.A.R. sends to Kuwait.

12. *Prospects.*

Canned mango slices and syrup can be stepped up from 150 tonnes to even 8,000 tonnes, provided the product is offered at competitive prices in par with peaches and pineapples. Mango nectar evinced substantial increase in recent years to 3,000 tonnes (Rs. 7·9 million) in 1967–68 mostly to U.S.S.R. and Kuwait. It is offered at 20 percent less than that of the Egyptian product. There is scope to export pulp to processors in other countries for reconstitution and use in jams. Processors in Iraq have evinced keen interest in entering into agreement with India, for manufacturing pickles and chutneys in Iraq, by obtaining raw slices in brine using the Indian know-how and market under Indian lable.

13. *Recommendations.*

1 Evolution of suitable varieties for the processing industry. Kanyakumari offers the ideal place for breeding programme because of the tendency of the mangoes to flower right through the year and all the varieties to flower-set fruit. A programme similar to sugarcane in Coimbatore to cater to all mango growing regions to be initiated. Since this is of national importance and caters to the mango growing regions in the country, it should be borne entirely by the centre.

2 Screening the existing varieties for the industry.

3 Elimination of the inferior types of varieties.

4 Launching of export oriented projects for large scale plantings with adequate incentives and credit in the existing mango belts, particularly in Kanyakumari district and part of Tirunelveli, North Arcot and Dharmapuri districts.

5 Establishment of sizable units in the producing areas.

14. *Grapes.*

Grape harvest in major producing countries are seasonal confining from July to October. In India harvests are mainly from December to May with the possibility of producing in other seasons also. The offseason market (December to May) is estimated at 50,000 tonnes. South Africa at present held a major share of this market. Varieties preferred in European markets are to be produced.

Processed Grapes : Canned Grapes and wines are the two important items, besides grape juice. About 90 per cent is utilised for the manufacture of wines.

Recommendations—

1. Trial consignment of choice varieties like Anab-E-Shai seedles, Muscat for consumer reaction and preference in potential market.

2. Varieties preferred to European market are to be introduced and acclamitised.

3. Production to be maximised during December-May period.

4. Screening the existing varieties for wine making and processing.

5. Launching of export and industry-oriented projects in suitable locations-Madurai and Dharmapuri districts.

15. *Canned Vegetables.*

During 1966, production of canned vegetables in India was of the order of 2,346 tonnes with peas, carrots and cauliflowers accounting for more than 65 per cent of the total. output.

Production of Canned Vegetables in India.

	Tonnes.		
	1964	1965	1966
Peas	780	1,136	975
Carrots	420	11	390
Cauliflowers	180	200	270
Tomatoes	280	430	80
Karala	186	489	40
Cabbage	147	200	30
Parwel	168	200	135
Cabbage curried	17	96	34
Baked beans in tomato sauce ..	140	420	120
Kundri	125	120	110
French flat beans	155	250	110
Tinda	202	505	70

15.1 Vegetable canning in India mainly caters to the defence requirements and civilian consumption and exports have not yet reached significant levels. Canned vegetable exports in fact have fallen steeply to 48 tonnes in 1967–68 from 118 tonnes in 1965–66. Main market for Indian canned items is U.K. and small quantities are despatched to the West Asian Markets as well. Main items are Karala beans in tomato sauce and Tinda.

15·2 In Tamil Nadu the estimated production of vegetables is of the order.

	Area in acres.	*Production in tonnes.*
Assorted Vegetables	2,00,000	12,00,000
Potato	40,000	20,000

There are hardly 10 units for vegetable processing devoted mostly to canning and dehydration of peas and beans. The production level is poor, hardly accounting for 20 to 30 tonnes valued at about Rs. 60,000. There is immense scope for the development of the vegetable processing industry.

The following industries may be considered for experiment :—

Canning and dehydration of peas and beans.
Dehydration of onion.
Mushroom production, canning and dehydration.
Potato chips industry.
Curry-powder industry.

16. *Future Prospects* : India has the requisite resource base to produce and export the processed vegetable items on a large scale basis. Opportunities are also not lacking, for, the European and Asian countries are increasingly importing processed speciality items from distant sources. In the field of pickles and chutneys, India's position continues to be unique. Large scale expansion in processed programme within the country and suitable marketing arrangements in the overseas markets will be needed. India should be able to reach an export level of 10,000 tonnes by 1975–76, if a bold programme of action is implemented.

17. *General recommendations.*

17·1 The existing varieties in different kinds of fruits and vegetables should be immediately screened for their suitability for processing and the varieties isolated to be popularised for extended cultivation. To commence with, the kinds of fruits and vegetables which are now having export potential are to be tested.

17·2 Separate research projects should be initiated at suitable centres for evolution of suitable varieties for processing. Mangoes, pineapples and citrus may receive the immediate attention in fruits. Tomato, ladys finger, Brussels sprouts and peas in vegetables may be tackled on priority basis.

17·3 The processing units should have link-up with the growers, if need be, forming growers co-operatives so that the suitable types may be produced and make available solely for the industry.

17·4 The average yield in India per hectare of the fruits and vegetables is too low when compared with other countires, viz. in bananas, Ecauder records 40 tonnes as against 20 tonnes in India. In oranges, Spain 30 tonnes, as against 10 tonnes in India, In Onions, U.S.A.

32 tonnes as against 9 tonnes in India. In Tomatoes, U.S.A. 30 tonnes as against 10 tonnes in India. There is an urgent need to increase the yield per acre not only by evolving high yielding varieties but also by judicious cultural practices. The package practices for each kind of variety requires to be spelt out.

17·5 There is a need for creation of one All-India Fruit and Vegetable Development Corporation exclusively for export by merging all such organisation fuctioning at present all over the country integrating the different States interested in development and export. The Corporation should be entrusted with (i) production of each fresh fruits and vegetables for export (ii) processing of fruits and vegetables for export.

17·6 The international market trends indicate positive preference to only certain varieties and such of those varieties are to be put under adaptive trials in selected areas. For instance, in bananas, cavendish types like Lecatan, giant Cavendish are preferred. In oranges, Washington Navel, Valentia Late Shamouti are in demand while flushed onions are preferred in world market as against the red type commonly growing in India.

17·7 The land holdings should be of economic size to facilitate application of modern techniques of cultivation. The existing ceiling on land holdings is not helpful. There exists certain exemptions in various State acts as in the case of plantations crop like coffee and tea. Holdings of adequate size is a pre-requisite for building up a modern horticultural industry and to that extent exemption from land ceiling may be granted.

17·8 The international market adopts scrupulous application of health regualtion, vigorous control and inspection methods both for local and imported products and the Indian standards should fall in line with the international standard either for fresh fruits or vegetables or for products.

17·9 The improved methods of packing that are extensively used in foreign countries are to be adopted here. Conventional packing methods should give place to the changing pattern suiting the consumer preference. Prepacking fruits with tissue paper is widely in use. Tray packing is common with apples, straberries and capscium against the conventional wooden boxes. Well-equiped packing houses should be set up in production areas.

17·10 Refrigerated trucks and wagons are essential for transport of these highly perishable produce from production areas to marketing centres.

17·11 Easy shipping facilities are the primary pre-requisites for increasing the exports and this country suffers by absence of such facilities. The time lag invloved by sea transport should be at the minimum, necessitating fast shipping service, with facilities for refrigerated storage. Exporting countries such as Ecauder and Honduras possess their own shipping boats for the exports of bananas. Chartering such boats on a long-term basis will ensure efficient supply and up keep of trade contracts. Air lifting of the highly perishable produce, is a common feature in developed countries. Isreal airlifts about 100 tonnes of fruits and vegetables daily to European markets. If the cost of freight is high, it will be essentia to provide a subsidy at least in the initial stages.

17·12 There should be adequate provision of ware-housing and cold Storage facilities at production centres, assembling points, loading and unloading ports. The horticultural industry at present in this country is conspicuous by its total absence of the above features resulting in damage or loss of nearly one-third of the total output.

17·13 The price of sugar offered for this industry is reported to be several times higher when compared to other exporting countries where sugar is made available at a subsidised rate at a uniform price irrespective of domestic requirements for export. The first quality carbonation sugar should be made available to this industry adequately.

17·14 Model processing units are to be established in major fruit and vegetables growing regions and serve as a model for encouraging private enterprises. The staff engaged should have adequate training in this technology, at Central Food Technological Research Institute, Mysore.

17·15 Precision equipments and machinery connected with this industry like vaccum cleaners, automatic filling machines, levelling machines, etc., requires to be imported for which adequate foreign exchange should be made available.

17·16 The proposed corporation should explore the possibilities for marketing of Indian Products through the established channels of some of the leading foreign companies, if need be, by suitable arrangements with major overseas distributors and repackers. The practice of marketing the produce under distributors' labels is in vogue in Eurpean countries (over 40 per cent of canned Foods of South Africa were shipped in United Kingdom under Local buyers labels) and our country also should adopt such practices for expanding export trade.

17·17 Aggressive publicity and promotion of the products in potential markets.

17·18 Entering agreement with foreign processors to whom base materials such as pulp, juice, etc., can be exported for reconstitution at the other end.

17·19 Exchange of Technical personnel with countries which have developed this industry.

17·20 Deputation of Technical Team to spot-study the various aspects of the industry in advanced countries.

CHAPTER XIX.

The Outlook for the Perspective Plan Period.

1. *Emphasis for the Future.*

1.1 The development of Tamil Nadu's economy in the sixties has enabled the State to emerge as one of the foremost in the country having a well-knit and dispersed industrial base. In fact, it is occupying the third place among States which have promoted new and sophisticated industries and if the momentum is retained the pace of development in the coming years can be such as to induce self-generating growth and help also further impressive progress on an intra-regional and even national basis. Apart from the benefit that can be derived out of the newly created facilities, the emphasis in the Perspective Plan period and later will have to be on the expansion of existing and promotion of agro-based and processing industries. This is because the scope for extension of irrigation facilities is limited and further significant progress will take some time as there can be an augmentation of water resources and increase in the area under different crops only when inter-State projects fructify. There may even have to be a change in the pattern of agricultural production with a view to increasing the yield of commercial crops and enabling a faster growth of agro-based industries. The accent will of course have to be mainly on the establishment of processing industries and such of those mineral-based industries which can function successfully with intensive exploitation of available mineral resources like salt, magnesite and magnetite iron ore. There will certainly have to be an intensification of geological exploration in order to find out whether oil can be struck in the Cauvery basin and off-shore areas and new bauxite and other non-ferrous metal deposits can be located. It will also be necessary to have a systematic programme of re-planting of denuded areas in the forest regions besides systematic afforestation. There will also have to be effective use of raw-materials like bagasse which are capable of regeneration on an assured basis.

1.2 The various Working Groups of the Task Force on Large Industries have made an attempt to strike out new paths and create a brighter image of Tamil Nadu as an industrially important State and capable of making a valuable contribution to the regional income which is proposed to be doubled in 12 years and creating surpluses which will be immensely helpful in bringing about infective industrial development in many other regions.

2. *Infrastructure Facilities.*

2.1 The most gratifying feature of recent industrial history are the accordance of proper priorities for the creation of infrastructural facilities, the emergence of a new class of entrepreneurs, the parallel growth of ancillary industries and the State's helpful role in promoting industries in the private and joint sectors with continued encouragement for viable well-conceived new schemes and a good use of the entrepreneurial skill. It would be possible to make the desired progress within the State, the region and in the neighbouring countries in South East Asia, Africa and Middle East with a good use of available entrepreneurial and technical skills and the promotion of well conceived joint sector overseas projects.

587C–59—22A

3. *New and Expansion Schemes.*

3.1 On the basis of the recommendations contained in the reports of the different working groups appointed by the Task Force on Large Scale Industries and taking into account the developments that will come about in the State and Central Sectors in the perspective plan period, the inescapable conclusion emerges that greater emphasis will have to be laid more than ever before on the implementation of new and expansion schemes of the agro-based industries and heavy chemicals, petro-chemical, mechanical and electrical engineering and mineral and metal-based industries. There will necessarily have to be faster growth of the sugar, textile, paper and cellulosic and mineral based fibre industries. But the States' industrial economy will become more broad-based and integrated with an increase in the stature of the petro-chemical industries while the mechanical and electrical industries will undertake the manufacture of more sophisticated items. The mechanical engineering industries particularly will gain special momentum with the completion of the Salem Steel Plant by the end of the Fifth Plan. While there is virtually unlimited scope for the growth of electrical and electronic equipment industries, there will of course have to be effective use of the vast salt resources in the state with the expansion of capacity for Caustic Soda, Soda Ash and other items. The output of fertilizers too will have to be increased substantially with the expansion of the capacity of the two existing big units and the establishment also of a thrid large sized coast based unit preferably in the Sixth Plan.

4. *Scope for Sugar, Cement, Textiles and Fertilizers.*

4.1 When assessing the scope for industrial development over a 12 year period it is necessary to bear in mind not only the expanding needs of the State's economy in several directions but also the opportunities that will be available for making a significant net contribution to the national pool by using to the maximum advantage the lead already possessed by many industries in the region. It is because of an inadequate appreciation of the new obligations that will have to be fulfilled by the better industrially developed areas to the All-India economic growth rate that confusion has arisen about the desirability or feasibility of the further rapid development of such important industries like sugar cement vanaspathi and fertilizers. The consumption of these products is bound to increase in the coming years at a rate which cannot be easily visualised at this stage. Also, in spite of the fact that quite a large number of States in the Country have the facilities of promoting these industries, it is likely that, as in the case of sugar and cement, many regions will continue to be important producers as at present with their export surpluses being helpful to other regions and also useful for developing exports to foreign countries. It is in this sense that the sugar industry will have to be developed on ambitious lines and the cotton textile industry enabled to retain its pre-eminent position. The same approach will have to be adopted in respect of automobile and allied industries as well.

4.2 In respect of cement, not long ago, there was a complaint that the industry had developed on a lopsided basis, little realising that compulsion will arise which will result in regions having suitable deposits of lime stone creating additional capacity even though they were temporarily bothered about the disposal of surplus production due to transport bottlenecks and other factors. The same confusion has arisen when assessing the requirements of chemical fertilizers and exaggerating the difficulties that may be experienced

in regard to the disposal of temporary surpluses. When All India production is now less than 50 per cent of total consumption and is unlikely that the gap will be filled even by the end of the fifth plan, with the continuing growth in consumption, there will necessarily have to be an expansion of the capacity of the existing units as well as the promotion of an entirely new unit, if need be. based on different feed stock like fuel oil.

5. *Central Sector Projects.*

5.1 With the Central Sector assuming a bigger shape following the advent of the Salem Steel Plant and the State Government implementing its own expansion schemes and joint sector projects, many new industrial complexes will spring up in the different parts of the State with some of the existing complexes becoming even more important in character. The Salem Steel Plant by itself will have a catalytic effect on the development of the mechanical engineering industries while the expansion of the high pressure boiler plant at Tiruchirappalli should lead to the promotion of many ancillary industries. In view of the fact that its capacity will be more than trebled in the two plan periods, a huge seamless pipe plant will have to be erected also in the Central Sector either in Tiruchirapalli or in Salem. The Teleprinter factory will of course have to diversify and increase its production ambitiously while the Photo Film plant will have to go in for substantial expansion. There will also have to be central sector units for the manufacture of telecommunication equipment, electronic components, special cables and other items. The State Sector will be increasing its output of billets, sponge iron, cement, fertilizer and other items besides contributing substantially to the development of joint sector projects through the T.I.D.C.O.* and the S.I.P.C.O.T.† while the T.I.I.C.‡ will be extending liberal help to the existing and new industries in the private sector. The modernisation and expansion of mills taken over by the Government will be the responsibilities of Textile Corporation.

6. *Power and Water.*

6.1 The complexion of the industrial economy in the State will undergo a significant change in the next decade. With the development of new industries, there will be need for large quantities of power and water. There will also have to be assured regular supplies of Railway wagons, besides an easing of transport bottlenecks. The creation of infrastructure facilities has been taking place on ambitious lines for sometime past and Tamil Nadu can boast of a vast and integrated net-work of transmission and distribution lines for electricity with effective development of river water resources and also tapping of underground water resources and the well-developed road system. But the new demands that have arisen as a result of well provided infrastructure and the new directions in which industrial development will take place emphasise the need for considerable advance planning in regard to the creation of power and water resources and the integration of road, rail and sea transport facilities. In spite of the fact that Tamil Nadu has been in the vanguard of the development of power resources and its per capita consumption of electricity has increased more than five-fold in the past two decades, there is an unsatisfied demand

---

* Tamil Nadu Industrial Development Corporation.

† State Industries Promotion Corporation of Tamil Nadu.

‡ Tamil Nadu Industrial Investment Corporation.

for power and dependence on purchases from neighbouring States. These surpluses are disappearing and also undependable during periods of monsoon failures. There will have to be easily creation of additional generating capacity to the extent of 6,000 m.w. in 1974–84 out of which nearly 75 per cent will have to be thermal in character either based on coal or nuclear fuel. If hydel capacity has to be created the target will have to be much higher beacuse of a lower load factor. However, there is not much scope for creating hydel capacity in a big way except with the co-operation of States like Kerala and Mysore. While the negotiations in this regard for sharing surplus waters for irrigation and power generation should be initiated without delay, thermal stations will have to be constructed at coastal points with the arrangements for import of coal by sea on a subsidised basis. The requirements of industries alone will be of the order of 3,500 m.w. in the Perspective Plan period and this goal can be reached only if a super thermal station at Neyveli, having a capacity of 1,000 m.w. based on a second mine cut, was constructed. Suggestions in this regard have been made long time back but the decision has been somehow postponed. As the opening of the mine cut itself will take three years to be completed an early decision is called for. Likewise, Tuticorin should have another super thermal station of 1,000 m.w. to be achieved in two stages. Ennore also will have to be expanded simultaneously along with Kalpakkam for increasing its capacity ultimately to 600 m.w. These projects will, however, give a capacity of only 2,700 m.w. and a decision has to be taken whether another atomic power station should be located in the southern districts. It may even be advisable to think of erecting a big thermal plant in Mettur though the advisability of locating new stations at Cochin and Kothagudam, based on coal, for making available power to the region will have to be examined. In the final analysis, power development will have to be carried out on a regional basis with integrated operations and integrated creation of thermal and hydel capacity. All planning for industrial development will be meaningless if there was no clear thinking in regard to the implementation of power projects on a continuing basis.

6.2 The availability of water for industrial purposes will pose serious problems as any competition for securing a share out of established resources should not result in a reduction of supplies for irrigation purposes. Scientific water management should be helpful in making economic use of scarce water resources but underground water reserves will have to be scientifically exploited so that there is no undue depletion or the emergence of problems arising out of the tapping of unsuitable water involving costly treatment. There will, of course, have to be desalination of sea water on a large scale in the not distant future and the manufacture of huge quantities of salt in the process will also be helpful in meeting the new needs of salt-based industries. But a distinct improvement in the availability of water can take place only if there was interlinking of rivers and prevention of river waters from wasting themselves into the sea. This is an important aspect of the water resources problem as a virtual famine may arise early in the Sixth Plan period if there was no advance action for securing inter-State co-operation.

7. *Communications.*

7.1 The problems in regard to rail, road and sea transport are of course easier of solution. The road transport network can be easily strengthened with an improvement of the quality of the surface and the width of roads and the construction of cement concrete stretches wherevever there is high density of traffic. It is only a question of allocation of

resources as the State possesses the necessary technical personnel and management capacity. In respect of railways there will have to be a uniform broad gauge system throughout the State and as described in the appropriate chapter the conversion of the existing metre gauge systems and complete electrification will have to be carried out on a time bound basis. Until such time the railway bottlenecks to the north are relieved, alternative arrangements will have to be made for moving bulk and even high rated commodities by sea and road routes. A large fleet of medium sized ships will have to be regularly employed for bringing coal, gunnies and other items and taking back also quantities of cement fertilizers, engineering goods and other items.

8. *Raw Materials.*

8.1 The Planning of industrial development in Tamil Nadu in a dynamic phase of transition can take place on the desired lines only if bottlenecks in regard to the availability of water, power and transport facilities were prevented from emerging and there were also adequate arrangements for making 'banks' of scarce raw materials like steel, non-ferrous metals, coal and many imported raw materials. The main industrial consumers will surely have to make their own arrangements for securing supplies of raw materials and components. But the State Government will be facilitating the smooth functioning of the different industries if stock yards for commodities which have to be secured from sources outside the State could be created by it on its own or in co-operation with the industries concerned. With a rising level of production and growing responsibilities, any difficulty in obtaining supplies of raw materials and components regularly will have serious consequences on the health of the economy besides resulting in heavy loss of production. The best results can be thus achieved only with the accordance of the greatest priority for the strengthening of infrastructure facilities and special attention to problems which will have to be tackled on an inter-State basis.

9. *Resource mobilisation.*

9.1 There may not be any serious difficulty in regard to the mobilisation of resources for financing such a large capital outlay. The Central Sector schemes for Rs. 785 crores will be implemented with funds completely provided by the Central Government when the State Government's direct investment in its own projects, those in the joint sector including assistance by way of subsidies, loans and direct participation in equity and preference capital of the joint sector projects may not exceed Rs. 250 crores though the actual outlay on State and joint sector projects will be substantial. There will thus be a balance of Rs. 1,220 crores which will have to be found by the promoters in the private, Co-operative and Joint sectors. The new entrepreneurs themselves may provide about Rs. 150 crores while internal resources of the existing new undertakings can easily account for Rs. 300 crores including regular provision towards depreciation charges. About Rs. 770 crores will have to be gathered from the investing public by way of issues of equity and preference shares, loans and other forms of assistance from the term lending institutions, the L.I.C. and the banking system. The bottleneck will be felt only in regard to physical implementation of the different projects if proper care was taken to provide continuously infrastructure facilities and bring about the balanced and integrated growth of the different sectors of the industrial economy.

10. *Outlay for the Vth and VIth Plans.*

10.1 Out of the total outlay of Rs. 2,255 crores in the Perspective Plan period, the State-owned projects may involve an expenditure of Rs. 18·00 crores in a seven-year period up to the end of the Fifth Plan, resulting in the working of the Concast Plant at Arkonam with its expanded capacity of one lakh tonnes of billets. The allied unit of sponge iron also will be coming up while the expansion scheme of the cement plant at Alangulam will result in the doubling of the capacity to four lakh tonnes annually. A new fertilizer unit will of course have to be thought of as a Sixth Plan Scheme. Besides, the State Government will be playing a very important role in the promotion of joint sector projects leading to the commissioning of the tyre plant at Ramanathapuram, the biggest fertilizer plant at Tuticorin a new unit for potassium chlorate, another for hydrosulphite of sodium, a forgings plant at Arkonam and a cigarette unit at Dharmapuri to mention only the more important projects. The investment in these projects by TIDCO, assistanace for new units in backward areas and financial help by TIIC and SIPCOT will be reflected in the total outgo of Rs. 76 crores from the State Government and its agencies. The aggregate investment on account of subsidies, modernisation of sick textile units and promotion of joint sector projects, will be Rs. 320 crores. In the Central Sector there will be massive investment of Rs. 450 crores as the Salem Steel Plant accounting for an outlay of Rs. 360 crores will be completed in the last year of the Fifth Plan. The expansion schemes of the Boiler Plant at Tiruchirappalli, the Teleprinter unit at Madras and the Defence establishments at Avadi, Tiruchirappalli and Aravankadu besides the expenditure on the strengthening of the existing mine cut at Neyveli and the rectification of the defects of the fertiliser plant will lead to a total capital expenditure of Rs. 450 crores in 1972—79. In the private sector there will be spectacular progress relating to the implementation of expansion schemes of the established sugar factories, the promotion of new sugar factories, the expansion of capacity for producing paper, rayon grade pulp, staple fibre, caustic soda, aluminium polyvinyl chloride, cement, automobile ancillaries, tyres, etc. While no precise estimate can be made of the investment in these and other projects, fresh investment may have to be of the order of Rs. 300 crores. The aggregate outlay in respect of all sectors will thus be approximately Rs. 1,070 crores in the first seven-year period. The balance of Rs. 1,185 crores will have to be invested in the Sixth Plan period, thus indicating that a strong foundation will be laid in the Fifth Plan period enabling future progress almost on a self-generating basis.

10.2 In the Sixth Plan, the State Government and its agencies may have to invest in the different projects in the State Sector and to extend assistance in various forms for Rs. 151·50 crores which may have the effect of generating a total outlay of Rs. 375 crores. The Central Sector will not be spending in the industrial sector on the same scale as in the Fifth Plan because of the completion of the Salem Steel Project. But there may have to be fresh outlay on the expansion of facilities of these plants and on the location of smelters for producing copper and zinc based on the imported concentrates, a seemless pipe plant, a desalination plant and expansion of telecommunication and electronic units that may be thought of in the earlier years. The total outlay on Central Sector schemes may be in the region of Rs. 335 crores. The balance of Rs. 475 crores will be accounted for by the Private

and Co-operative sectors. The pace of development in the Sixth Plan in the different sectors of the industrial economy can be easily hastened as with considerable experience gained, as stated above, the stage of self-reliance would have been reached.

10.3 As impressive progress has been achieved in the past $1\frac{1}{2}$ decades with the adoption of a perspective policy of the State Government a well-knit industrial base has been created, the growth in industrial production can easily range between 10 and 12 per cent on an average in the perspective plan period. With the helpful attitude of the State Government the zeal displayed by old and new entrepreneurs in new ventures and the capability of the region's population to adapt itself to new situations, the Task Force feels confident that the State can become even more important industrially, besides helping the realisation of the objective of doubling the per capita income in a twelve-year period and making a valuable contribution also to the nation's pool of resources.

587C-59—23

CHAPTER XX.

Special Recommendations.

The Task Force makes the following special recommendations for bringing about an impressive, integrated and dispersed development of industries in Tamil Nadu:—

1. There has to be bolder planning for the further development of agro-based industries with a view not only to catering to the needs of the State but also making a sizeable contribution to the National Pool. The sugar industry particularly has to be developed in an integrated manner and there will be need for quadrupling production in 1972 - 1984. A large complex should be established in Thanjavur district for producing sizeable quantities of sugar, alcohol and paper. The use of bagasse as raw material for paper should be encouraged with the availability of furnace oil to sugar mills on a duty free basis.

2. Special facilities should be given for textile units for implementing the modernisation programme and helping them also to retain their share of the home market over a period.

3. The backward areas in Ramanathapuram, Tirunelveli, Kanyakumari and Dharmapuri and North Arcot Districts should be intensively developed with special reference to regional resources and the attitude of labour. The incentives provided by the Government are helpful but financial assistance may have to be made available on even more soft terms. The promoters also should be asked to contribute not more than 10 per cent of value of the fixed assets if not 10 per cent of the issued equity capital. The State Government should examine the feasibility of providing a definite encouragement for the promotion of salt-based, mechanical and electronic industries .The incentives may be in the form of really attractive terms for power consumption for limited periods and sizeable rebate in sales tax for those engineering industries which manufacture sophisticated equipment and for entirely new units for the manufacture of electronic components. The professional class of managing directors and managers should be granted special benefits in the shape of allowances for education of children, their travel abroad and for medical treatment which will rank as expenditure for tax purposes

4. The industrial units should be permitted to have their own captive power unit in a group or on their own, if it was found by these units that genaration of power from own sources would be a good insurance against a short-fall in production in the event of restriction on consumption. The present practice of levying a duty even on power generated and consumed by the units concerned should be discontinued.

5. The maintenance of stock Yards for coal, steel and other raw materials at strategic point is imperative in order to ensure continuity of operations.

6. Special attention to be paid to a reassessment of available water resources for industrial, organisational and potable purposes as without the augmentation of supplies, serious difficulties may arise in the implementation of ambitions industrial programmes A separate cell should be appointed for effecting a systematic survey of river and underground resources and also for making recommendation about how there can be considerable savings in the use of water for various purposes and available resources can be made to go a longer way. There will also have to be schemes for desalination of sea water for making it available at least for bunkering purposes.

7. The transport bottleneck may not be eased in the forseeable future. The State Government should therefore make special arrangements in co-operation with the industries concerned for organising the regular movement of raw materials and components by road and rail and an effective method of subsidising movement by sea should be devised. It was found that the railways were unequal to the job.

8. In order to facilitate the development of industries where technical know-how has to be imported the existing bigger units should be asked to provide the necessary technical assistance on a reasonable basis. The concerned foreign collaborators should be made to agree to sub-contracting of know-how.

9. Technical experts should be in charge of Central and State Government projects and the State Government also should be associated with the management of Central Sector Projects even in an advisory capacity as it would eliminate inadquate understanding of regional and special problems and delay in overcoming shortcomings.

10. Joint sector projects in South East Asia, Africa and Middle East should be encouraged with the State Governments providing special assistance to the entrepreneurs or the experts concerned for carrying out negotiations, surveys and incurring expenditure in connection with preliminary work.

11. Effective arrangement should be made for carrying out a regular census of production and collating data pertaining to large and medium industries. Periodic techno-economic surveys of the different districts should be carried out and there should be a special cell in the Directorate of Industries and Commerce for evaluating the progress of industries in the difierent sectors.

12. With the increase in the volume of goods and services, it is essential to think of a distributive mechanism in the shape of Joint Stock Companies which will buy raw materials, stock them and supply them to the industries and buy the finished products from them after giving them a processing charge for being distributed to bulk consumers and general consumers. The objective of the system will be to eliminate wholesalers and middlemen with a view to achieve stability in prices of essential commodities.

13. Early measures have to be taken to develop the packaging industries in a big way so that the distribution of goods is not affected for want of packaging materials.

The scope for establishing jute mills in Tamil Nadu for meeting the needs of packaging and other materials of industrial consumers and the agricultural sector should be exploited. Initially, the jute mills may obtain their requirements from sources outside the State but the feasibility of cultivating jute in Thanjavur district and other areas where steeping water is available should be examined and sizeable acreage brought under the crop over a period.

14. Special emphasis should be laid on Research and Development and the State should help a pooling of research facilities on an industry-wise basis by establishing special units with contribution from industries and the State and Central Government. A full fledged management institute for training managerial and technical personnel should be started by the Government.

15. Labour policy should be such that it encourages improvement in productivity and prevents avoidable interference to operations and wherever possible multiple shift working should be introduced. This will be helpful in increasing employment and production.

INVESTMENT, INCOME AND EMPLOYMENT FOR THE PERIOD 1972—1984.

Investment	*Gross value of the output*	*Value added by manufacture*	*Employment in lakhs of persons*		*Aggregate employment in lakhs of persons.*
			Direct	*Indirect.*	
(RUPEES IN CRORES.)	(RUPEES IN CRORES.)	(RUPEES IN CRORES).			
2255	3000	1600	7.5	20	27.5

APPENDIX I.

INVESTMENT PORTFOLIO.

1. *Abstract of investment.*

Total outlay for the Perspective Plan Period.
(1972–1984).

	(RUPEES IN CRORES.)
1. State Industries Projects	98·50
2. Central Sector Projects	785·00
3. Co-operative Sector	30·00
4. Industrial Research	50·00
5. Joint Sector and Private sector Projects ..	1,291·50
Total ..	2,255·00

2. Details of Projects.

A. State Industrial Projects.

	Outlay proposed in Perspective Plan period.
	(Rupees in crores.)
1. Sponge Iron Plant	4·00
2. Concast Plant expansion	3·00
3. Tamil Nadu Cement Expansion	7·50
4. Fertilizer Plant	74·00
5. For the projects under implementation in the last two years of the Fourth Plan ..	10·00
	98·50

B. Central Sector Projects.

	Outlay proposed in Perspective Plan period.
	(Rupees in crores.)
1. Salem Steel Plant	360·00
2. Salem Steel Plant Expansion	100·00
3. Neyveli Second Mine cut	30·00
4. Expansion of existing central sector Units.	25·00
5. Zinc and Copper Smelter Plants	50·00
6. Heavy Water Plant	15·00*
7. Industrial Refinery	60·00
8. Seamless Steel Tubes Project	50·00
9. Electronics	75·00
10. Desalination Plant	20·00
	785·00

* This may go beyond Rs. 20 crores as per later estimates.

C. Co-operative Sector.

	Outlay proposed in Perspective Plan period.
	(RUPEES IN CRORES.)
Sugar Factories, Paper Mill in Other items ..	30·00

D. Industrial Research.

Research and Development Work	50·00

E. Joint Sector and Private Sector Projects.

Serial number and name of Industry.	*Outlay proposed in Perspective Plan period.*
	(RUPEES IN CRORES.)
1. Automobiles and allied industries	150·00
2. Metal-based industries	175·00
3. Chemical and allied industries	208·50
4. Sugar Industry	48·00
5. Cement, Ceramics, Refractories and Glass Industries.	55·00
6. Paper and its allied products	150·00
7. Alcohol	5·00
8. Electronics	75·00
9. Electricals	80·00
10. Textiles	235·00
11. Handlooms	60·00
12. Vanaspathi	10·00
13. Rice Mill Industry	35·00
14. Fruit Processing Industry	5·00
	1,291·50

3. Investment break-up for important industries in the Joint and private sector.

Name of the Industry.	*Outlay.* (Rupees in crores.)
A. ***Automobiles*** :	
(i) Cars	20·00
(ii) Commercial Vehicles	40·00
(iii) Tractors	20·00
(iv) Auto-ancillaries	20·00
(v) Motor Cycles and scooters	10·00
(vi) Tyres	30·00
(vii) Cycles	10·00
Total ..	150·00

B. Metal-based industries-machinery and machine-tools.

	(Rupees in crores.)
(i) Steel	75·00
(ii) Aluminium	30.00
(iii) Copper	23·00
(iv) Other non-ferrous metals	5·50
(v) Machinery	34·50
(vi) Machine Tools	7·00
	175·00

C. Chemicals and its allied Industries.

	Outlay (Rupees in crores.)
(i) Soda Ash and Ammonium Chloride ..	15·00
(ii) Salt expansion near Tuticorin and Vedaranyam.	5·00
(iii) Metallic Sodium	0·50
(iv) Metallic Magnesium	0·50
(v) Potassium Chlorate	1·15
(vi) Metallic Phosphorous	1·00
(vii) Borax and Boric Acid	0·85
(viii) Sodium Hydrosulphite	3·00
(ix) Titanium Chloride	2·00
(x) Titanium White	2·00
(xi) Coke Oven Plant	5·00
(xii) Caustic Soda	16·00
(xiii) Nylon Tyre Cord Plant	11·00
(xiv) Nylon Filament Yarn	6·00
(xv) Nitric Acid Plant	3·00
(xvi) Expansion of Viscose staple fibre	5·00
(xvii) Rubber Tyres	16·00
(xviii) Monomer Plant	15·00
(xix) Pharmaceuticals	10·00
(xx) Anti-serum	0·50
(xxi) Naphtha Cracker	80·00
(xxii) Caprolactum	10 00
Total ..	208·50

APPENDIX II.

(*Source* : S.I.S.I. Publication.)

Districts in Tamil Nadu—Resources, Infrastructure And Industries, Chingleput.

Chingleput, which is a coastal district, has an area of 8,172 square kiolmetres (8·25 lakh hectares). There are a few hill ranges in the district.

Population and Resources.

Human Resources.—The population of the district according to the provisional census figures of 1971 is 28·89 lakhs—18·84 lakhs rural and 10·05 lakhs urban. 10·16 lakh people are classified as 'workers' constituting 35·17 per cent of the total population.

Agricultural Resources.—The total land area of the district is about 8·25 lakh hectares. Of this, the area under cultivation is 4·55 lakh hectares—3·15 lakh hectares irrigated and 1·40 lakh hectares unirrigated. Paddy, ragi, pulses, etc., are some of the important food crops grown in the district. Groundnut, gingilli (Sesamum) and sugar cane are the important commercial crops. All these are crushed by mills in the district. Fruits like bananas and mangoes available in the district are consumed locally as well as in the neighbouring districts. Cashew is also grown in the district, though in limited quantities.

Forest Resources.—The forest area in the district covers about 64,180 hectares. The yield of forest produce in the district does not offer much scope for industrial exploitation.

Fishery Resources.—The district has a coast line of 142 kilo metres there and there are 45 fishing villages. Inland fishing in the district is confined to ponds, lakes and backwaters. Fish landed in the district is generally consumed in the district and in the neighbouring district of Madras.

Livestock.—Chingleput is one of the important districts where tanneries are concentrated. The hides and skins available in the district are tanned in about 30 tanneries in the district.

Mineral Resources.—Clay of different varieties is found in different parts of the district. It is utilised by M/s. Parry and Company, Ranipet (North Arcot District) for the manufacture of sanitarywares and acid jars. M/s. Stoneware Pipes Limited, Tiruvallur also utilise it for manufacturing stoneware pipes, fire bricks, etc. Plastic clay available in the district may be utilised for manufacturing glazed pottery. Besides, white glass sand is known to occur in the area between Tiruvottiyur and Kathivakkam. Also, gem stone in Satyavedu, Gypsum near Ennore, quartz in Kambakkam hills are reported to occur.

Industrial Climate and Economic Facilities.—The district being adjacent to Madras City, the capital of Tamil Nadu, commends the requisite industrial climate and infrastructure facilities needed for the development of industries. It, therefore, attracts entrepreneurs from different parts of the country (and also abroad) for setting up industries.

In view of the advantageous location of the district, a number of private as well as public sector large scale units have been set up in the places adjoining Madras city such as Ambattur, Avadi, Madhavaram, Red Hills, Sembiam, Alandur, Tambaram, etc. The large scale units manufacture multifarious engineering and other products. The district has a Rural Industries Project at Sriperumbudur.

The district has one conventional Industrial Estate at Ambattur, a functional Industrial Estate for Leather at Madhavaram and one private Industrial Estate, viz., K.R. Sundaram Industrial Estate at Tiruvottiyur.

Transport and Power.

Roads and Railways.—The taluk headquarters and important towns in the district are well connected by roads. The district is served by the Southern Railway. All the taluk headquarters except Sriperumbudur are connected by rail.

Canals and Waterways.—The Buckingham Canal passes through Madurantakam, Chingleput, Saidapet and Ponneri taluks in the district. It is used for transport of goods in boats to Madras city and to villages on the side of the canal. The coastal products like casurina and salt are transported cheaply by this means.

Power supply.—Power supply is reported to be generally adequate to meet the requirements of industrial units in the district. With the commissioning of the Atomic Power Station at Kalpakkam the district will be in a favourable position with regard to the supply of power.

Education and Technical Training.—The percentage of literacy as per 1971 (provisional) Census figures in the district is 39·1. The polytechnics and the Madras Institute of Technology offer courses in Civil, Mechanical, Electrical, Aeronautical, Automobile, Electronics Engineering and Instrument Technology.

Existing Industries :

A. *Large scale* (121 units).

There are a number of large scale units in the district manufacturing a variety of products, important among which are as follows :—

1. Automobiles, scooters, motor cycles and parts
2. Tractors and parts
3. Railway coaches and wagons and heavy vehicles
4. Ferrous and non-ferrous castings, steel forgings, malleable castings, etc.
5. Steel structurals, steel re-rolling, wire and wire products, tubes, etc.
6. Bicycles and parts, industrial sewing machines, machine tools, etc.
7. Teleprinters and calculating machines
8. Surgical instruments.
9. Fertilisers, chemicals, pharmaceuticals, petroleum products, matches etc.

10. Electrical products such as transformers, switchgears, cables, conductors, insulators, tubelights, meters, etc.

11. Tyres and tubes

12. Leather tanning and leather products.

13. Sheet glass, refractories, mechanised bricks, fire bricks, etc.

14. Miscellaneous products such as sugar, flour milling, textile yarn, fountain pen, etc.

B. *Small-scale* (1863 *registered units*).

1. Domestic utensils.

2. Fountain pens and parts.

3. Rolling and re-rolling mills

4. Radios and amplifiers.

5. Paints and varnishes.

6. Plastic, celluloid and polythene products.

7. Bolts, nuts and bifurcated rivets.

8. Structural fabrication (manufacturing gates, grills, roof trusses, etc.)

9. Steel trunks.

10. G. I. buckets and drums.

11. Iron castings.

12. Automobile components.

13. Cement products.

14. Miniature lamps.

15. Acids.

16. Machine Tools.

17. Reclaimed rubber.

18. Leather tanning.

19. Bricks.

20. Scientific instruments.

21. Spectacle frames, etc.

COIMBATORE.

The District which lies in the western part of the State has an area of 15,603 square kilo metres (15·68 lakh hectares). Four important rivers the Cauveri and its tributaries, the Bhavani, the Noyyal and the Amaravathi, flow through the district.

Population and Resources.

Human resources.—Of the total population of 43·57 lakhs as per the 1971 Census, 28·04 lakhs are rural and 15·53 lakhs urban. 18·04 lakhs people are classified as workers constituting 41·41 per cent of the total population.

Agricultural resources.—Out of the total land area of 15·68 lakh hectares, the area under cultivation is 8·49 lakh hectares of which 3·05 lakh hectares is irrigated. The district is deficient in respect of food crops. Sugar cane, cotton, oil seeds and tobacco are the important commercial crops.

Forest resources.—The forests of the district cover an area of 4·06 lakhs hectares. The forest products include major items like teak, sandalwood and bamboo and minor items like tamarind, avaram and lac.

Fishery resources.—The annual quantity of catch is estimated at 3,591 tonnes. Large quantities of sea fish, in iced as well as in dried condition, are brought into the district from the western and eastern coasts.

Livestock resources.—The livestock population of the district would be about 25 lakhs (1961). Hides, skins and wool are the main livestock products which are well utilised in industry.

Mineral resources.—Corundum, asbestos, magnesite and mica are the different types of minerals reported to be available in the district. Limestone of grey and pink colours occur over a length of 7 miles in the hills near Madukkarai, about 7 miles south of Coimbatore. This is used for the manufacture of cement.

Transport and Power.—The district is well served by road and rail and has adequate power supply for industrial consumption, being in the proximity of the hydro-electric project in the neighbouring district of Nilgiris.

Industrial climate and economic facilities.—The district has a very good industrial base, being the major centre of cotton textile industry in the South. It is also an important centre of electrical motors and pump manufacturing industries. The industrial community in the district is known for its dynamism and entrepreneurial and innovative abilities. These factors have made the district industrially one of the most advanced districts of the State.

The district has a string of technical training and industrial research institutions and is well endowed with all the requisite infrastructure and other economic facilities conductive to industrial growth. The district has 3 industrial estates (Erode, Coimbatore and Pollachi) including one private and one co-operative estates.

Educational and Technical training.—There are 4 technical institutions/engineering colleges in the district imparting training in different technical trades. There are also institutions devoted to industrial research like the South India Textile Research Association.

Under the small industries development programme, an Industrial Extension Centre of the Small Industries Service Institute, Madras, is functioning at Coimbatore and it imparts technical training in various trades.

Existing Industries.

A. *Large-Scale* (165 units).

1. Cotton Textiles (approx. 110 units)
2. Electric motors.
3. Machine tools.
4. Cotton textile machinery and parts.
5. Bone meal and fertiliser mixtures.
6. Plastic buttons.
7. Domestic utensils.
8. Steel structurals.
9. Centrifugal pumps.
10. Sugar.
11. Oxygen and acetylene gas.
12. Synthetic fibres.
13. Reclaimed rubber.
14. Portland cement.
15. Asbestos cement.
16. Leather tanning.
17. Machine tools.
18. Steel castings and forgings.

B. *Small-Scale* (2,340 registered units).

1. Electrical motors and centrifugal pumps.
2. Cotton textile machinery and parts.
3. Structural fabrication.
4. Leather tanning.
5. Leather footwear and leather goods.
6. Hosiery.
7. Furniture.
8. Soap.
9. Manufacture of buttons and plastic containers.
10. Fertiliser mixtures.
11. Boring machines.
12. Suit cases.
13. Insecticide sprayers.
14. Polythene bags and sheets.
15. Weighing machines.

DHARMAPURI.

Dharmapuri district was created on 2nd October 1965 by bifurcating the then composite Salem district. The main rivers flowing through the district is Cauvery. The area of the district is 9,628 square kilometers (9·63 lakh hectares). The district has been classified as backward.

Populations and Resources.—The population of the district as per the 1971 Census (provisional) is 16·74 lakhs. Of this, 15·30 lakhs are rural and 1·44 lakhs urban. The number of workers in the district is 6·31 lakhs constituting 37·74 per cent of the total population.

Agricultural resources—Out of the total land area of 9·63 lakh hectares, the area under cultivation is 4·55 lakh hectares of which 1·69 lakh hectares is irrigated.

Paddy, sugarcane, ragi, gingilly and groundnut are important crops grown in the district besides fruit crops like mangoes and grapes. Tamarind is also an important produce and nearly 1·38 lakh tonnes of tamarind fruits are available annually.

About 32 per cent of the total area in the district is cultivated. Of this, 15·8 per cent is irrigated.

Forest Resources.—The forest area of the district accounts for about 3·11 lakh hectares. Bamboo forms the major resource of which 7,000 tonnes per annum is being utilised by paper mills outside the district for conversion as pulp. Other varieties of wood are mainly used as fuel. The forest resources, therefore, are limited.

Livestock Resources.—Livestock population of the district is approximately 10·18 lakhs. There is a livestock farm at Hosur on an area of 1,650 acres. Pe digree cattle, pigs and poultry are raised in the farm mainly for supply throughout the State.

Mineral resources.—The district is not well endowed with mineral deposits. Minerals like Kankar, Corundum hydrons-silicate of aluminium and iron, felspar, vermiculite and mica occur in patches. As the deposits are reported to be sporadic they do not lend themselves to industrial expolitation.

Industrial climate and economic facilities.—The economy of Dharmapuri is characteterised by the predominance of agriculture. The district has not in dustrially developed sufficiently and has remained backward. However, with the completion of the Dharmapuri-Bangalore section of the rail link from Salem to Bangalore, the establishment of a large scale co-operative sugar mill at Palacode, and the expansion programme contemplated by the existing alloy steel plant at Dodampatti it may be possible to generate an industrial climate in this district in the near future. The setting up of the proposed steel plant in the adjoining district of Salem will also have its impact on the industrial development of this district.

Transport and Power.

Transport —The district is fairly well served by roads and railways. The broad gauge Madras-Salem railway line passes through the eastern part and the Salem-Bangalore emtre guage passes through the southern part of the district.

Power.—The Madras Electricity System supplies power to the district. Adequate power supply is available in the district. The district has two industrial estates one at Hosur and the other at Krishnagiri.

Education and Technical Training.—The percentage of literacy in the district is 31·5 compared to that of Tamil Nadu viz., 39·39.

The Industrial Training Institute at Hosur provides training in trades like welding, turning, fitting, electrical wiring, machinist, etc.

Existing industries—

A. *Large-scale* (1 unit).

There is only one sugar mill in the large-scale sector.

B. *Small Scale* (264 *registered units*).

The important products manufactured in the Small Scale sector are food products, wooden articles, leather goods, engineering goods, etc.

KANYAKUMARI.

This is the southernmost district of Tamil Nadu. It is located at the foot of the western ghats and has a few hill ranges. The important rivers in the district are Paraliar, Kothayar, Valliar and Pazhayar. There are a number of lakes and back waters in the district. The district has an area of 1,672 sq. kilometres (1·67 lakh hectares). The district has been clasified as industrially backward for provision of concessional financial assistance from financial institutions.

Population and Resources.

Populaiion.—The district has a population of 12·28 lakhs as per the 1971 provisional census figures. Of this, 3·52 lakhs are classified as workers constituting 28·69 per cent of the total. Of the total population, 10·24 lakhs are rural and 2·04 lakhs urban.

Agricultural Resources.—Out of the total land area of 1·67 lakh hectares, the area under cultivation is 1·12 lakh hectares of which 0·59 lakh hectares are irrigated. The principal crops grown are paddy, tapioca, coconut, plantain, arecanut, cashew, etc. The plantation crops in the high lands of the districts are tea, rubber and coffee. Pepper is grown in the high lands and in the plains in certain areas. Mango and jack are important fruits of the district. Except for tapioca and fruits, the production of food crops is inadequate to meet the requirements of the district.

Forest Resources.—The area under forest is about 47,300 hectares which constitutes 29 per cent of the total land area of the district. The forest produce in the district consists mainly of valuable timber like teak, eatty, blackwood, rosewood, themba, vengai, etc. Apart from the different varieties of timber, minor forest produce like tanning materials, medicinal plants, canes, reeds, lemon grass, bamboo, etc., are also available.

Livestock Resources.—Hides and skins available in the district are utilised to a little extent in the local tanneries and the rest sent out to the tanneries in different centres in Tamil Nadu.

Fishery Resources.—Kanyakumari district has a coast line of about 68 kilometres. The main varieties of fish available in the district are white bails, ribbon fish, sharks, mackrels seav, sardine, etc. Of the total catch about 50 per cent is consumed locally and the rest sent out to other districts and to Ceylon.

Other Marine Resources.—Salt is produced from sea water and after meeting the local consumption, is sent out to other districts in the State and to Kerala.

Mineral Resources.—The minerals available in the district are ilmenite Peyrrhotite, garnet, monazite and lime stone. Ilmenite and monazite are processed locally.

Industrial Climate and Economic Facilities.—Kanyakumari district, though small in size, is an important agricultural district. Industrial development has lagged behind but the rich agricultural, plantation, marine and forest resources available in the district offer good scope for further development. The district has two industrial estates, of the conventional type, at Marthandam and Nagercoil.

Education and Technical Training.—The percentage of literacy in the district as per 1971 Census (provisional figures) is 58·1 per cent—second highest in the State. The Polytechnic and the Industrial Training Institute functioning in the district offer facilities for training in technical traders. With the high degree of literacy which the district enjoys, technical and other skills can be easily developed.

Transport and Power.

Transport.—The district as a net work of roads, but is not served by railway. It is expected that railway line from Tirunelveli to Nagarcoil will be constructed during the IV Plan period. If canal transport could be developed, it would play an important part in the development of industries. There is a natural port at Collachel and steamers call at this port mainly to load palmyra fibres and mincrels like illmenite and monazite.

Power.—No difficulty will be experinced in getting electricity for industrial units.

Existing Industries—

(*A*) *Large Scale* (4 *units*)—

1. Recovery of illmenite and monazite from sea sand.
2. Textiles.
3. Cashew processing.

(*B*) *Small Scale* (191 *registered units*).—

1. Cashew kernel processing industry.
2. Brush industry.
3. Electrical accessories (wooden).
4. Tiles.
5. Steel trunk and buckets.

(*B*) *Small Scale* (191 *registered units*)—cont.

6. Tyre retreading.
7. Bell metal works.
8. Wooden and can furniture.
9. Tapioca flour.
10. Leather footwear.
11. Leather tanning.
12. Safety matches.
13. Splints and veneers.
14. Agricultural implements.
15. Bolts and nuts.

MADRAS.

Madras city,the capital of Tamil Nadu and one of the premier cities of the country, covering an area of 126·7 sq.kms. has a population of 24·70 lakhs as per the provisional figures of 1971 census. The district is completely urban in character. It is the most thickly populated district in the State with the highest density of 19,299 persons per sq. km. as against the State average of 316.

Owing to various reasons—locational, historical and others—the city has come to acquire over a length of time, the pride of place in the south in industry, commerce and trade. The city enjoys all the requisite infra-structure facilities—power, transport, communications and availability of technically skilled labour—needed for rapid industrial growth and easy access to markets in the southern region as well as outside. It has a major port, important rail and road connections, and an airport through which several international and domestic air services operate.

Existing Industries :—

(*A*) Large Scale (87 units).

(*B*) Small Scale (6,429 registered units).

A wide variety of industries have sprung up in and around Madras—automobiles and ancillaries, chemicals, fertilisers, railway coaches, heavy vehicles, cycles, tyres and tubes, etc., to mention only a few. There are 87 large-scale industrial establishments and 6,429 registered small-scale units in this district. Most of the small-scale units are those engaged in light engineering, structural fabrication, machinery and parts, electrical and electronic items, tools and dies, chemical and plastic products, pharmaceuticals, food products, leather goods, etc.

The city and the suburbs have a number of industrial estates including the fore-runner among them, the Guindy Industrial Estate. There are two conventional estates-Guindy and Ambattur—four functional estates one each at Madhavaram (for leather) Kakkalur (for electricals), Adyar (for instruments) and Adyar (for instruments and Electronics), a private estate viz. K. R. Sundaram Private Industrial Estate at Tiruvottiyur and a co-operative estate at Vyasarpadi. However, these estates except those at Guindy and Adyar, form part of Chingleput district. Nevertheless, due to their proximity to the city, they contribute to its industrial growth.

MADURAI.

Madurai district lies at the foot of the Western ghats, and has an area of 12 610 sq. kms. (12·65 lakh hectares). The important rivers in the district are Vaigai and Suruli. Madurai, the head quarters of the district, is the second largest city in the State. The famous Meenakshi Temple is situated here. The district has been classified as industrially backward entitling the industrial units located in it to obtain concessional finance from financial institutions.

Population and Resources.

Human Resources.—The population of the district is 39·31 lakhs (26·06 lakhs rural and 13·22 lakhs urban) as per the 1971 provisional Census figures. 14·78 lakh persons are classified as workers and constitute 37·60 per cent of the total population.

Agricultural Resources .—Out of the total land area of 12·65 lakh hectares the area under cultivation is 5·68 lakh hectares, of which 1·92 lakh hectares are irrigated.

Paddy and cholam are the most important foodcrops and groundnut and sugarcane the most important commercial crops in the district. Groundnut is mostly utilised for extracting oil. The sugarcane is utilised by sugar mills and bagasse and molasses are available from these mills. Bananas, mangoes, grapes and oranges are grown in large quantities.

Forest Resources .—About 13 per cent of the total area (1·66 lakh hectares) of the district is covered by forests. Wattle bark, lac hill grass and soft wood are the important forest produce.

Fishery Resources .—Fishery resources are almost insignificant and they offer no scope for industrial utilisation. The catch from inland waters is consumed locally.

Livestock Resources .—The livestock population in the district according to the 1961 census is 23·19 lakhs of which bovine population is 12·88 lakhs. The value of hides and skins, tanned annually, is estimated at Rs. 160 lakhs of which about Rs. 120 lakhs worth are exported. About 300 tonnes of fleshings and about 1,500 tonnes of goat and sheep hair are available per year.

Mineral Resources .—Bauxite and limestone are the important minerals that are available in the district. Bauxite found is of good quality.

Industrial Climate and Economic Facilities .—Though the district is predominantly agricultural, it has a good industrial potential. Madurai city has a few large-scale industrial units and is one of the important industrial centres of the State. Some of the factors favouring the growth of industries are the availability of :—

1. Entrepreneurs with modern ideas.
2. Labour capable of picking up skill in a short period.
3. Agricultural produce such as sugarcane, groundnut, cotton, etc.

The district has, besides three conventional industrial estates (at Madurai, Theni and Dindigul) and one functional industrial estate for food and fruit based industries at Batlagundu

Transport and Power .—The total length of railway lines in the district is 219·6 kms., all metre gauge. There is a good net work of roads connecting various places in the district. The district has adequate power supply and gets its requirements from the Madras Grid.

Education and Technical training ·—The district has a University and an Engineering College, besides Polytechnics, Industrial Training Institutes and aided Industrial Schools imparting training in various technical courses. The Small Industries Service Institute has an Extension Centre at Madurai, which interalia, offers technical training facilities.

Existing Industries—(A) Large Scale (31 *units*)—

Madurai is an important centre for textile industry in the State. Besides, the important products manufactured in large scale sector are :—

1. Bus bodies.
2. Sugar.
3. Rubber goods.
4. Pyro-technic aluminium powder.
5. Tanned leather.
6. Paper.

B. Small Scale (1,555 *registered units*)—

1. Leather tanning.
2. Lock industry.
3. Iron safes.
4. Steel trunks and suitcases.
5. Steel structurals.
6. Domestic hardware.
7. Agricultural implements.
8. Foundry and engineering.
9. Domestic utensils (brass, copper and aluminium).
10. Electrical goods and control equipment.
11. Comphor tablets.
12. Confectionery.
13. Cement products.
14. Steel furniture.
15. Bicycle parts and accessories.
16. Card Board.
17. Soaps.
18. Fruit canning and preservation.
19. Safety matches.
20. Automobile spare parts.
21. Fluorescent tube lamps.
22. Arc welding transformers.
23. Tin containers.
24. Wooden furniture.
25. Plastic goods.

THE NILGIRIS.

The Nilgiri District is hilly tract of land. It has a total geographical area of 2·54 lakh hectares (2,548 sq. kms.) (of which 1·08 lakh hectares are under forest) and a population of 4·91 lakhs according to 1971 Census. Ootacamund, a small town at an elevation of about 2,287 metres, is the headquarters of the district. The Pykara, the Sigur, the Kundah and the Kateri are the important rivers of the district.

Population and Resources .—Of the total population of 4·91 lakhs, 2·49 lakhs are rural and 2·42 lakhs urban. The working force in the district is 1·92 lakhs or about 39·12 per cent of the total population.

Agricultural Resources .—The major vegetable cultivated is potato and the other important vegetables are cabbage, peas, radish, beans, carrot, etc. Among fruits, bananas and citrus varieties are important. Peaches, plums, strawberries and other cold climate fruits are also grown in the district. The important plantation crops of the district are tea and coffee.

Forest Resources .—Timber, wattle bark and eucalyptus globulus (blue gum) are the important forest produce of the district. The timber yield is about 41,000 cft. per annum.

Livestock Resources .—The livestock resources in the district are not very significant. However, there is surplus milk production estimated at 6,500 to 7,500 litres per day.

Mineral Resources .—The main minerals which occur in the district are bauxite (19·85 lakh tonnes), clay, mica and iron-ore (the last one approximately 2·2 million tonnes).

Industrial Climate an d Economic Facilities .—The district has not registered any marked progress in the field of industrial development. Even the limited resources available in the district have not been effectively utilised locally for industrial purposes.

Transport and Power .—Unlike ma ny other hilly area in the country, the district is comparatively well-developed in infra-structure facilities like transport, power, etc. The district has the unique distinction of being a source of hydro-electric power in the three main power projects in the State, viz., the Pykara, the Moyar and the Kundah are in the district.

Education and Technical training. –The general educational facilities in the district are quite adequate. The percentage of literacy in the district as per the 1971 Census (provisional) is 47·3 which is higher than that of the State viz., 39·39. The availability of technical skills in basic trades and the training facilities there of are also adequate.

Entrepreneurial ability .—Owing to industrial backwardness of the district in general, the entrepreneurial talent is somewhat inadequate and in order to enable entrepreneurs to start industries in the district, adequate incentives in the form of tax concession, cheap factory accommodation at subsidised rent, rebate on the purchase of raw materials, consumption of power and fuel and transport cost, liberal credit facilities, etc., guaranteeing the purchase of finished products by Government Departments/large scale units, etc., publicity regarding the availability of resources in the district and establishment of more industrial undertakings in the public sector, would be necessary.

Existing Industries.—The district has very few industrial undertakings to its credit. Plantation industry is the major industry and there are more than 160 tea factories, producing black tea.

A. Large-Scale (4 *units*)—

1. Explosives.
2. Photo films.
3. Different types of needles.

B. Small-Scale (59 *units*)—

1. Iron and steel products.
2. Essential oils.
3. Fruit preservation.
4. Soap.
5. Plastic products.

NORTH ARCOT.

North Arcot district which has an area of 12,148 sq. kilometres (12·27 lakh hectares) is one of the industrially under-developed districts in the State and has been classified as industrially backward for the purpose of provision of concessional finance by financial institutions. The important river is Palar, though it is dry for most of the year. The district has a sound agricultural base.

Population and Resources .—The population of the district as per 1971 Census (Provisional) figures is 37·38 lakhs. Of this, 29·57 lakhs are rural and 7·81 lakhs urban. 13·67 lakh persons are classified as workers constituting 36·59 per cent of the total population.

Agricultural Resources :—Out of the total land area of 12·27 lakh hectares, the area under cultivation is 6·97 lakh hectares of which 3·70 lakh hectares is irrigated. Paddy is the main food crop and the district is surplus in respect of this crop. Groundnut and sugarcane are the most important commercial crops in the district.

Forest Resources .—The district has a forest area of 3·18 lakh hectares, i.e., about a quarter of the total geographical area of the district. The sandal wood trees are felled, sized and classified by the Government and sold in auction at the Government Depot at Tirupathur every year. Certain varieties of soft wood such as "Thanukku", "Peethanukku", etc., are available from the forest. Some of the important minor forest produce in the district are gall-nuts, manipungam, avaram and konnai barks, which are consumed by the local tannery units. Further, tamarind and myrobalam are the other minor items available in the district.

Livestock Resources .—Of the various livestock products available, hides, skins and wool are utilized for industrial purposes.

North Arcot is an important centre for leather tanning in the State and there are more than 130 units engaged in this industry. Nearly 90 per cent of the hides and skins produced in the district are exported to other places and countries. The fleshings available

from the tanneries are collected and converted into glue. Nearly 200 tonnes of leather waste which could be utilised for manufacturing leather boards, is available in the district. The wool available in the district is utilised for the manufacture of druggers and carpets.

Fishery Resources:—The district has no sea coast and has only inland waters consisting of tanks, wells, rivers, etc. It is estimated that approximately 2,000 tonnes of fish are available annually and are mostly consumed locally. The fisheries do not hold any scope for industrial exploitation.

Mineral Resources .—Vermiculite, white clay, building stone, road metal, felspar and steatite are the different types of minerals available in the district, but most of these are not available for commercial exploitation except vermiculite, granite and building stone.

Industrial Climate and Economic Facilities .—There is not much of large scale industrial development except for sugar mills, spinning mills and a factory producing acids, chemicals fertilisers, sanitaryware, etc. Necessary infra-structure facilities and skills are available in the district which are conducive for industrial development. With a view to accelerating the industrial development of the district the Government of Tamil Nadu have set up some departmental common facility and servicing units. Because of Vellore, the district headquarters and other important towns such as Katpadi, Ranipet, Arcot, Arkonam, etc., being not very far off from Madras City, the main marketing centre of the State, entrepreneurs are keen to start industries in the district.

Transport and Power.

Transport.—The district has a net work of roads linking important centres in different taluks of the district as well as different district headquarters in the State. The district is also served adequately by rail transport. The total length of rail lines is 347 kms.—209 kms. of broad gauge and 138 kms. of metre gauge.

Power :—The district is served by the Mettur Hydro-Electric System and the Madras Thermal Power System. Adequate power supply is available.

Education and Technical Training.—The percentage of literary is 34·3 which is lower than that of the State. There are two polytechnics and two industrial training institutes in the district imparting training in various engineering and technical trades.

Existing Industries .—

A. Large Scale (11 *units*)—

1. Sugar.
2. Spinning mills.
3. Chemicals and fertilisers.

B. Small-Scale (1,029 *registered units*)—

1. Leather tanning.
2. Leather footwear.
3. Light engineering.
4. Steel trunks.
5. Matches.

6. Wooden furniture.
7. Soap.
8. Art silk weaving.
9. Malted food and confectionery.
10. Soaps, perfumes and cosmetics.
11. Paints, varnishes and insecticides.
12. Paper products.
13. Matches.
14. Sanitarywares, tiles, slates and cement products.
15. Structurals, metal containers, sugar and Oil mill machines, bolts and nuts agricultural implements.
16. Power driven pumps.
17. Radio receivers.
18. Plastic moulded goods.

RAMANATHAPURAM.

Ramanathapuram District with an area of 12,559 sq. km. (12·56 lakh hectares) stretches from the Western Ghats to the Bay of Bengal and is bounded on the north by Madurai, Tiruchirappalli and Thanjavur Districts, on the east by the Palk Bay and on the south by the Gulf of Mannar and Tirunelveli District. Kerala State abuts the district on the west and on the south-western corner. The climate of the district is hot and dry with very low and irregular rain fall. The district is considered to be economically the most under-developed in the State and has been classified as industrially backward for provision of concessional finance to industrial units.

Population and Resources.

Population.—The population of the district as per the provisional 1971 Census figures is 28·57 lakhs. Out of this, 21·12 lakhs are rural and 7.45 lakhs urban. The working force in the district is 10·64 lakhs and this constitutes 37·27 per cent of the total population.

Agricultural Resources.—Out of the total land area of 12·56 lakh hectares, the area under cultivation is 6·59 lakh hectares of which 2·50 lakh hectares is irrigated almost entirely by tanks and wells spread all over the district. The important crops grown in the district are paddy, cumbu, varagu, chillies, cotton and groundnut. Coconut trees grow in large numbers in the coastal areas. The acreage under coconut and cashew in the district has increased considerably owing to the special programmes of intensive cultivation of these crops. Palmyra trees grow in wild laxuriance all over the district. Chillies find good market in the country and abroad.

Cotton grown in the district is fully utilised by the ginning mills and groundnut is crushed by the oil mills in the district. The processing of cashew kernals and the manufacture of cashew shell oil offer good scope for development. The development of coconut plantations not only offers scope for oil crushing but also for production of coir fibre by the mechnical defibering process. Palmyra leaves and fibre are used for making boxes, brushes and fancy articles on a cottage industry basis.

corest Resources.—The forest area in the district is confined to the Western portion of Srivilliputhur taluk and covers 1·27 lakh hectares. The forest produce is made up of jungle wood and deciduous species, mostly used as fuel. The chip board factory at Rajapalayam is also trying a few species of wood for the manufacture of chip boards.

Livestock Resources.—The skins and hides collected in the district are sent to the tanneries in Tamil Nadu, especially to Dindigul in Madurai district.

Marine Resources.—The district has a coast line of about 260 kms. along which fishing is carried on in about 45 villages, the important ones being Thondi, Rameswaram, Mandapam and Devipattinam. Kilakkarai is an important place for chank fishing. The Indo-Norwegian Project at Mandapam is building and supplying mechanised boats to enable fishermen to carry on fishing in a scientific way under the guidance of the Fisheries Department. Sardines, Pomfrets, Prawns, sebiam, etc., are consumed partly within the district and partly sent outside the district in frozen condition. According to the experts in Central Marine Fisheries Research Institute the landings of cannable varieties of fish such as prawns and sardines are not only inadequate to sustain a fish canning unit but are also seasonal. But certain varieties of fish such as " Silver bellis " are suitable for the manufacture of fish meal. Apart from fisheries and chank fishing, a variety of seaweeds are found along the shallow seas of Ramanathapuram taluk for about 50 kms. alongside the coast line. Sea weeds are utilised in the manufacture of Agar in the neighbouring district of Madurai.

Mineral Resources :—The chief mineral resources available in the district is limestone and is found to occur in Aruppukkottai, Sattur and Srivilliputhur taluks. The cement factory at Tulukkapatti is fully utilising the lime stone deposits.

Clays of different varieties suitable for the manufacture of bricks, tiles and earthern-w are occurring in the taluks of Sivaganga, Ramanathapuram and Srivilliputhur are being fully exploited.

Besides, yellow ochre, gypsum and graphite are also reported to occur in the district but are not large enough for industrial exploitation.

Industrial Climate and Economic Facilities.—Though the district is economically underdeveloped, it offers good scope for industrial development in view of certain natural resources—marine, mineral and agricultural and the availability of entrepreneurial abilities in certain areas. The district has two conventional industrial estates one each at Sivaganga and Virudhunagar and a co-operative estate at Sivakasi.

Transport and Power.

Road :—Important agricultural and commercial centres in the district are connected by road. There are regular bus services from Madurai, the administrative headquarters of the district, to all important places in the district.

Rail.—The important commercial centres in the district are well linked by rail except Kamudi and Mudukulathur.

Power :—All the towns and major villages in the district have been electrified and power is available in these places for agricultural, industrial and domestic consumption.

Education and Technical training.—The percentage of literacy in the district as per 1971 provisional Census figures is 39·5 which compares favourably with that of the State. Adequate facilities exist for technical education and training in the district. The Engineering College at Karaikudi, the Polytechnics and industrial training institutes in the district provide technical education and training in different branches of engineering and technical-trades.

Existing Industries :—

A. Large Scale (49 *units*)—

1. Ginning and spinning mills.
2. Surgical cotton, bandage cloth and dressings.
3. Cement.
4. Textile-paper tubes.
5. Chip boards.
6. Machanised fishing boats.

B. Small Scale (2265 *registered units*)—

1. Safety matches.
2. Fire works.
3. Litho printing.
4. Fountain pen nibs.
5. Paper tubes and embossed labels for fire works.
6. Printing ink.
7. Tin containers.
8. Hospital requisites.
9. Playing cards.
10. Black insulation tapes.
11. Polythene lay flat tubing.
12. Spring washers.
13. Cement products.
14. Domestic utensils.
15. Rice and oil mill stores.
16. Shoe tacks.
17. Coffee and chicory powder.
18. Bricks and tiles.
19. Cement products.

SALEM.

The district, after its bifurcation into Salem and Dharmapuri districts on 2nd October 1965, has an area of 8634 sq. km. (8·64 lakh hectares). The important river flowing through the district is Cauvery. The district has a number of hill ranges. One of the significant features of the district is its mineral wealth. Salem is also an important handloom weaving centre.

Population and Resources

Population.—The population of the district as per the 1971 provisional census figures is 29·87 lakhs—21·92 lakhs rural and 7·95 lakhs urban. 12·02 lakhs are classified as workers, constituting 40·26 per cent of population.

Agricultural Resources :—Out of the total land area of 8·64 lakhs hectares the area under cultivation is 4·87 lakh hectares of which 1·68 lakh hectares is irrigated. The important food crops raised in the district are paddy, cholam, cumbu and ragi. Some of the important commercial crops grown in the district are sugarcane, groundnut, cotton, gingelly, tapioca, coffee, etc. The most important fruit crop of the district is Mango. Other fruits are oranges, watermelon and custard apple.

Forest Resources.—About 19 per cent (1·67 lakh hectares) of the total area of the district is covered by forests. The main produce from these forests are sandalwood, bamboo and timber (silver oak and similar varieties). Sandal wood and bamboo are consumed within the district for the extraction of sandalwood oil and manufacture of paper respectively. Minor forest produce like gal nuts, avaram and konnai bark are mostly sent to important tanning centres outside the district.

Fishery Resources.—Mettur reservior and other irrigation canals are the major fishing grounds in the district. Fish caught in the district is mostly consumed locally.

Livestock Resources :—The district produces a number of livestock products such as milk, hides, skins and horns. Hides and skins available in the district are mostly tanned locally.

Mineral Resources.—The mineral resources of industrial importance occuring in the district are iron ore, bauxite, magnesite, quartz, limestone, felspar, steatite, etc. Iron ore is to be utilised for the manufacture of steel by the proposed steel plant. Bauxite is utilised for the manufacture of aluminium virgin metal. Magnesite ores are being exploited for the manufacture of basic refractories. Limestone is utilised by a cement factory. Quartz is utilised in the district as well as outside it for the manufacture of glass. Felspar is utilised outside the district in the manufacture of glass, ceramic and pottery industries. Steatite is also sent outside the district for use as filler in rubber, insectcides soap, talcum powder, paper, etc.

Other minerals such as chromite, corundum, asbestos, beryl, mica, columite and vermiculite, although occrring in the district, have not been exploited for industrial purposes, since the quality and quantity available need to be further investigated.

Industrial Climate and Economic Facilities.—The district has certain commercial advantages owing to its location. Important transport routes—road and rail, pass through this district. The district has already a fairly good industrial base and the business community is also enterprising. The setting up of the proposed steel plant will open wide avenues of future industrialisation. Certain other favourable factors which offer scope for development of industries in the district are given below :—

1. Presence of natural resources such as minerals.
2. Working of the Rural Industries Project at Omalur taluk.
3. Expansion and development of large scale industries. There are two industrial estates in the district, Mettur and Salem, including one co-operative estate.

Transport and power.—Salem district has a good net-work of roadways connecting the important industrial and commercial centres. Salem, the headquarters of the district is also served by broadgauge and metre gauge railways connecting it with Madras, Bangalore, Cochin and other important towns.

With the Mettur hydro-electric system and Mettur Tunnel scheme generating electric power in the district, no difficulty is envisaged in the matter of supplying electric power to industrial units.

Education and Technical training.—The polytechnic at Salem offers diploma courses in civil, mechanical, electrical and textile engineering. The Institute of Handloom Technology offers diploma course in handloom technology. Besides, there is an engineering college offering degree course in civil, mechanical and electrical engineering. The State Government have set up industrial training institutes, which train people as fitters, machinists, turners, welders, electricians, etc.

Existing Industries—

A. *Large Scale* (26 units)—

1 Spinning mills
2 Magnesite mining and processing
3 Caustic soda
4 Chloromethane
5 Chlorine
6 Calcium chloride
7 Hydrochloric acid
8 Vanaspathi
9 Washing and toilet soaps.
10 Non-ferrous rolling mills, flour mills
11 Glass
12 Sugar
13 Sandalwood oil distilling
14 Carbon paper
15 Paper and board
16 Cement
17 Pharmaceutical
18 Typewriter ribbon
19 Packing materials, etc.

B. *Small Scale* (2,373 registered units)—

1 Starch and sago
2 Textile
3 Cement products
4 Agricultural implements
5 Builders' hardware
6 Domestic hardware
7 Domestic utensils
8 Buckets, drums, etc.
9 Steel trunks
10 Rice mill parts
11 Oil expellers
12 Diesel oil engine and pump sets

13 Wire nails
14 Expanded metal
15 Bicycle accessories
16 Automobile components
17 Dyestuff
18 Packing materials
19 Soap
20 Mixed fertilisers
21 Pharmaceutical products
22 Beverages
23 Graphite crucibles.
24 Hosiery.

SOUTH ARCOT.

South Arcot district covers an area of 10.90 lakh hectares (10.899 sq.km.). The district has been classified as industrially backward for provision of concessional finance to industrial units. The district is predominantly agricultural though the process of industrial development has been initiated by the setting up of the Neyveli Lignite Project the largest public sector complex in the State.

Resources and Population.

Population.—The population of the district as per the provisional Census figures of 1971 is 36.07 lakhs. Of this 12.02 lakhs people are classified as workers, constituting 40.26 per cent. Out of the total population, 30.94 lakhs is rural and 5.13 lakhs urban.

Agricultural Resources.—Out of the total land area of 10.90 lakh hectares, the area under cultivation is 7.02 lakh hectares of which 3.86 lakh hectares are irrigated. Paddy is the main food crop and the district is surplus with regard to this crop. The chief commercial crops are groundnut, sugarcane and cotton. Groundnut is mostly crushed locally. Sugarcane is consumed by the sugar mills in the district and is also utilised for the manufacture of jaggery. Cotton is also mostly utilised locally. Cashew is grown extensively in the district and the yield of cashewnut is about 6,500 tonnes per annum. The entire quantity of cashew nuts is processed locally. Further about 2,000 tonnes of crude cashew oil is extracted from raw cashew shells.

Forest Resources.—Only about 64,000 hectares i.e. about 6 per cent of the total land area, is covered by forest in the district. Except for some species of firewood, the district has no timber of industrial value. Small quantities of sandalwood, teakwood and bamboo are available in the forest which are inadequate to support any industry.

Fishery Resources.—The district has a long coast line with facilities for the development of deep sea fishing. The numerous backwaters and irrigation tanks afford ample scope for estuarine and inland fishing. Large variety of fishes are hauled from the sea, important among them being silver bellies, pompfret, prawn, cat fish, shark rays, etc. The fish hauled in the district is roughly estimated to be 25,000 tonnes per annum of which about 20,000 tonnes go for local consumption, leaving about 5,000 tonnes for sending out to neighbouring areas and to Kerala State. There appears to be good scope for canning of fish and prawns.

Livestock Resources.—Hides and skins available in the district are mostly sent to the tanneries in the neighbouring district of North Arcot. Bone is utilised for the manufacture of bone meal in the district.

Mineral Resources.—Important minerals that occur in the district are lignite, clay and limestone.

Lignite is being utilised by the Neyveli Lignite Corporation. White clay available in the area (about 45 lakh tonnes) is being utilised in the manufacture of ceramic ware in the district as well as in North Arcot and Tiruchirappalli districts. Limestone is utilised. for the manufacture of slaked lime and by the cement factories in Tiruchirappalli district

The existence of other minerals such as copper, zinc, lead, etc., is being explored by the Government.

Salt production at Marakkanam is estimated at 40,000 tonnes per annum and there is scope for the manufacture of some chemicals out of the by-products available from salt farms.

Industrial Climate and Economic Facilities

Transport and Power—Transport.—The district has a good network of roads and railways. It has about 4,400 kilometres of roads and about 400 kilometres of railways. The National Highways touches important towns like Ulundurpet, Villupuram and Tindivanam. All the taluk headquarters except Gingee and Kallakurichi are connected by rail.

Power.—The district gets its supply of electricity from the State grid, while the district itself is contributing to the supply of electricity to the State, through the thermal power station at Neyveli. Adequate power supply for industrial purpose is available.

The district has two functional industrial estates at Vridhachalam and Vadalur for ceramic industries.

Educational and Technical Training.—The Industrial Training Institutes at Cuddalore and Ulundurpet impart training in technical trades.

Existing Industries—

(A) *Large Scale* (19 *units*).

Among the large scale units, the Neyveli Lignite Corporation with its immense industrial potentialities deserves special mention.

The capital investment of the Central Government in the Neyveli Lignite Corporation is Rs. 171 crores. The different constitutions of the Corporation are mining department, thermal power station, fertilizer plant, briquetting and carbonisation plant and clay washing plant.

Others—Large scale insdutries—

1 Malleable iron caps, inserts, pipe fittings, etc.

2 H.T and L.T. insulators.

3 Mixed fertilisers.

arbon-dioxide.

5 Sugar

6 Confectionery.

7 Cashew kernal and cashew shell liquid.

8 Sanitaryware.

9 Textile mills.

(B) *Small Scale* (890 registered units)—

1 Cement products.

2 Light engineering.

3 Flavouring essences.

4 Coir industry.

5 Toys.

6 Wire products.

7 Soap.

8 Steel trunks.

9 Cashew kernal processing and cashew shell oil extraction.

10 Electrical porcelain goods.

THANJAVUR.

The district has an area of 9,684 sq. km. (9·68 lakh hectares) and is known as the granary of Tamil Nadu. The strong agricultural base has provided one of the most essential pre-requisites for growth of agro-industries and also for other industries in general. The district is almost wholly irrigated by Cauvery river, with its net work of canals. The district has been classified as backward.

Population and Resources.

Human Resources.—The population of the district according to the 1971 census (provisional) is 38·32 lakhs—30·44 lakhs rural and 7·88 lakhs urban. Of this 13 lakhs people (33·94 per cent) are classified as workers.

Agricultural Resources.—Out of the total land area of 9·68 lakhs hectares, the area under cultivation is 7·94 lakhs hectares of which 6·13 lakhs hectares are irrigated. Paddy is the principal crop of the district. About 200 rice mills are scattered all over the district.. It is estimated that about ·45 lakhs tonnes of rice bran would be available from the rice mills if collected properly. Sugarcane, groundnut, tobacco, tapioca, coconut, banana, sun hemp and cashew are the important commercial crops of the district.

Forest Resources.—The district is practically devoid of forests, the area under forests being only about 0·14 lakh hectares.

Livestock Resources.—The total bovine population (cattle and buffaloes) in the district is reported to be 19·41 lakhs and sheep and goat 6·53 lakhs. Hides and skins available in the district are salted and sent to the tanneries at Tiruchirappalli and Dindugal Animal bones are converted into bone-meal in the district.

Fishery Resources.—Fishing is carried on an extensive scale along with 150 mile long coast line. Almost the entire catch of fish is consumed within the district and a small quantity is sent to Cochin and Madras.

Mineral Resources.—The mineral resources available in the district are quartz, sand stones, laterite, kankar, ilmenite bearing sand and turfaceous limetstone. But reserves of these minerals are not of much industrial significance.

Industrial Climate and Economic Facilities.—With about 60 per cent of the total area under cultivation, the district may be stated to have an occupational slant towards agriculture. Apart from other pursuits such as trade, it is reported that only seven percent of the total working force is engaged in manufacturing activity.

There are certain factors which create a congenial climate for industrial development :

(1) The existence of the port of Nagapattinam.

(2) The presence of departmental centres such as the Service Centre for Brasswares at Kumbakonam and the Design Centre for Agricultural implements at Tiruvarur, facilitate the healthy growth of industries.

(3) Presence of educated working force.

The district has three industrial estates at Thanjavur, Kumbakonam and Nagapattinam.

Transport and Power.—All the important commercial and agricultural centres in the district are connected by road and rail. The Vedaranyam canal which is about 32 miles long connects Vedaranyam, the centre of salt industry with Nagapattinam port.

The district gets its supply of power from the Mettur and Periyar Power Houses. Adequate electric power will be available for small-scale industries which come up in the district.

Educational and Technical training.—The district enjoys a fairly high per centage of literacy, i.e., about 40 per cent. The industrial training institutes and polytechnics impart training for technicians and skilled workmen. There is no dearth of skilled labour for new small enterprises likely to be set up in the district.

Existing Industries.—

A. *Large Scale* (10 units)—

1. Sugar Mills.
2. Steel Rolling Mill.
3. Automobile body building and servicing units.
4. Recovery of chemicals from bitterns of salt farms.
5. Spinning mills.
6. Fire works.
7. Modern rice mills.

B. *Small scale* (1,473 registered units)—

1. Agricultural implements.
2. Steel trunks.
3. Lanterns.
4. Cement products.
5. Chalk crayons.
6. Soaps.
7. Salt works.
8. Safety pins.
9. Rice mills.
10. Oil mills.
11. Printing press.
12. Food products.
13. Cosmetics.
14. Wooden furniture.
15. Drugs and Pharmaceuticals.
16. Tobacco products.
17. Domestic utensils.

TIRUNELVELI.

Tirunelveli district covers an area of 11,415 sq. kms. (11·42 lakh hectares) and is at the southern end of the Indian sub-continent. Though the economy has an agricultural bias, it provides a congenial climate for industrial development.

Population and Resources.

Population.—The total population of the district as per the 1971 provisional Census figures is 31·94 lakhs. Out of this, 11·90 lakhs are classified as workers constituting 37·53 per cent of the total population. Of the total population, 21·66 lakhs are rural and 10·28 lakhs urban.

Agricultural Resources.—Out of the total land area of 11·42 lakh hectares, the area under cultivation is 5·50 lakhs hectares of which 2·29 lakh hectares are irrigated. The main crops of the district are paddy, cotton, groundnut, gingelly and chillies.

Paddy is hulled by over 110 rice mills in the district and approximately 13,000 tonnes (annually) of rice bran is reported to be available. Cotton is ginned by the ginning factories and the lint is used by the spinning mills. Groundnut and gingelly are crushed into oil and the groundnut oil is used mainly by soap and tanning industries.

Forest Resources.—The district has 1·27 lakh hectares of forest area. Some of the important species of wood available are rosewood, teakwood, aini, Unnam, Manjakkadambu, Palmyra, etc. The approximate annual yield of timber in the North and South forest divisions of the district would be about 4 lakhs c. ft.

Fishery Resourses.—The district has a coast line of 176 kms. A wide variety of fish such as caran, cornima, seer, perches and shark are hauled from the sea. Nearly 70 per cent of the fish hauled is consumed locally and the rest sent outside.

The district is fringed on its coastal line by a coral reef where in lie pearl oysters. Sale of pearl oysters brings a good income to the district. Chank fishing is another industry carried on in a systematic and organised manner. Chanks are sent to West Bengal for being cleaned and converted into bangles, rings, buttons and ornamental wares. By deep sea fishing large quantities of shark fish are hauled. Oil is extracted out of shark liver at different centres in the district. The entire oil is sent to the Government Oil Factory at Calicut.

Livestock Resources.—The hides, skins, bones and horns, etc., available in the district are mostly used in the tanneries and bone-meal industry in the district.

Mineral Resources.—The important mineral deposits in the district are limestone, graphite and garnet. Limestone available in the district is suitable for the manufacture of cement, chemicals like bleaching powder, calcium carbide and precipitated calcium carbonate. The cement factory at Talayuthu and the Chemical factories at Talayuthu and Arumuganeri depend on this limestone.

Graphite.—About 1,000 tonnes of graphite are reported to be available in Kuninkulam. No systematic quarrying is carried on at present.

Garnet.—About 56,000 tonnes of garnet sand are reported to be available in the Orai, Navaladi area along the coast. It is too fine to be of any industrial use.

Industrial Climate and Economic Facilities.—The port of Tuticorin has provided a congenial climate for industrial development. The coastal areas of the district have a concentration of salt making units. The district is also noted for its pearl fishing. The district has two conventional industrial estates at Pettai and Kovilpatti and one co-operative estate at Tuticorin. The district has a Rural Industries Project at Nanguneri.

Transport and Power.

Transport.—The taluk headquarters and important towns in the district are well connected by roads.

The metre gauge of the Southern Railway in the district serves all important divisional and taluk headquarters in the district except Nanguneri.

Power.—The district gets its supply of power from the State grid which is fed by the power house at Papanasam. Power supply is reported to be adequate in the district.

Educational and Technical training.—The district is fairly advanced in the filed of education and the percentage of literacy as per the 1971 provisional Census figures is 36·38. Technical education at the supervisory level in electrical, mechanical and civil engineering courses are offered by the Shankar Institute of Technology. Technical training at workshop level is provided by Industrial Training Institute at Pettai.

Existing Industries.—

A. *Large Scale* (26 units)—

1. Spinning mills.
2. Caustic soda.
3. Calcium carbide.
4. Cement.
5. Steel drums.
6. Potassium chloride.
7. P.V.C.
8. Paper and pulp.
9. Flour.

B. *Small Scale* (1,388 registered units)—

1. Steel trunks.
2. Tin containers.
3. Bolts, nuts and rivets.
4. Roofing tiles and cement products.
5. Matches.
6. Soap.
7. Timber sawing.
8. Footwear.
9. Fireworks.
10. Leather tanning.
11. Paper bags.
12. Paper tubes.
13. Salt works.
14. Printing press.
15. Dyeing.
16. Cotton ginning and baling.
17. Automobile accessories.
18. Structural fabrication.
19. Ferrous and non-ferrous castings.
20. Ferrous and non-ferrous re-rolling mills.
21. Sewing thread.
22. Electric water heaters and coolers.
23. Plastic goods.

TIRUCHIRAPPALLI.

Tiruchirappalli district with an area of 14,259 sq. kms. (14·28 lakh hectares) is in the centre of Tamil Nadu. The most important river flowing through the district is the Cauvery. The district has been classified as backward for provision of concessional finance from financial institutions.

Population and Resources.—The total population of the district as per the 1971 Census (provisional) figures is 38·45 lakhs of whom 14·53 lakhs constitute the working force. Of the total population 29·90 lakhs are rural and 8·55 lakhs urban.

Agricultural Resources.—Out of the total land area of 14·28 lakh hactares, the area under cultivation is 8·35 lakh hectares of which 3·14 lakh is irrigated. The important crops are paddy, cholam, cumbu, groundnut and sugarcane. Groundnut is crushed in the local oil mills and sugarcane in the local sugar mills.

Forest Resources.—Forests constitute 6·8 per cent (97,450 hectares) of the total land are. The important forest produce are sandalwood, fuel, bamboo, tamarind and cashewnut The output being negligible, they do not offer scope for setting up any forest-based industry.

Fishery Resources.—Tiruchirappalli being an inland district, fishery resources are scanty.

Livestock Resources.—The hides and skins avaialable in the district are tanned locally.

Mineral Resources.—Important minerals that occur in the district are clay, limestone, kankar, granite, gypsum and felspar and red and yellow ochres, corundum, garnets vermiculite, etc. Gypsum and limestone are utilised for the manufacture of cement Red and yellow ochres available in the district are used in colour washing of walls. Corun dum and garnet available in limited quantities may be useful for making jewel bearings of watches. Vermiculite known to be available in limited quantities may be used for insulation purposes. Felspar is utilised by the ceramic units in Tamil Nadu and Kerala.

Industrial Climate and Economic Facilities.—The district is predominently agrarian n character but the progress of industrial development is gaining momentum. Large, scale industries, particularly, have made good progress. The Central public sector project viz., the High Pressure Boiler Plant of Messrs. Bharat Heavy Electricals, Limited, offers good scope for the development of ancillary industries. An ancillary industrial estate has been set up at Thiruverambur for the above plant. Besides, there are three conventional estates at Tiruchirappalli, Pudukkottai and Karur.

Transport and Power.

1. *Transport.*—The district is well served by road and rail. Tiruchirappalli junction is one of the important railway divisional headquarters in the South. There is an air-port in Tiruchirappalli providing passenger service.

Power.—There will not be any difficulty in getting power supply to industrial units.

Education and Technical Training.—The percentage of literacy in the district as per 1971 Census (provisional) figures is 37·4. Technical education is given due importance in the district. The Regional Engineering College and the Polytechnics offer training in engineering trades and Junior Technical Schools impart training in technical trades.

Existing Industries.—

A. *Large Scale* (31 units)—

1. High Pressure boilers (BHEL) (Central Public Sector).
2. Steel fabrication and M.S. re-rolled items.
3. Automobile bodies.
4. House servic e metres.

5. Carbon di-oxide.
6. Cellulose acetate products.
7. Sugar.
8. Cattle feed.
9. Tanned skins.
10. Cement and refractories.
11. Textile mills.
12. Flour.
13. Small arms (Central Public Sector).

B. *Small Scale* (1,089 registered units)—

1. Artificial diamond cutting.
2. Cast items.
3. Domestic utensils.
4. Agricultural implements and domestic hardware.
5. Wall clocks.
6. Bicycle parts.
7. Conduit pipes.
8. Wire drawing.
9. Cement products.
10. Soap .
11. Radio assembly.
12. Chalk crayons.
13. Tape and thread.
14. Ink.
15. French polish.
16. Paper boards.
17. Polythene bags.
18. Hosiery.
19. Shoe tacks.
20. Steel trusses.
21. Activated carbon.
22. Automobile repairing and servicing.

APPENDIX III.

Ancillary Industries in Tamil Nadu.

The process of specialisation in the industrial field has often manifested itself in the growth of ancillary units. The ancillary units concentrate on some component or part required by the parent unit in its production process. Modern industrial organisation is such that no large scale unit can manufacture all the things that it requires under its own roof. Even the most efficient large scale unit will find this a formidable task owing to a number of difficulties of production and management.

It is here that modern small scale ancillary industries play an important role as complementary units to the large scale sector. The lower overhead costs and fixed capital involved enable them to manufacture components, parts, etc. required by the large scale units at economic prices which the latter themselves would not be able to do. The extent to which this can be done depends no doubt on the type of industry concerned, the process and the level of technology required, availability of skills and raw materials, scales of operation and other relevant factors. However, it is generally accepted that farming out components, etc. is beneficial to the large scale unit as it conserves its managerial and productive resources which could be put to more fruitful uses. The small scale unit also benefits from this arrangement by being assured of a regular and permanent market for their output.

A small scale and ancillary unit has been defined as :

" A unit which produces parts, components, sub-assemblies and tooling for supply against known or anticipated demand of one or more large units manufacturing or assembling complete products and which is not a subsidiary to or controlled by any large unit in regard to the negotiation of contracts for supply of its goods to any large unit ." Units which are set up primarily for replacement market fall also within the scope of the above definition.

Considering the need for higher capital required by ancillary units, the ceiling of fixed capital investment of Rs. 7·5 lakhs for a small scale unit has been raised to Rs. 10 lakhs for ancillary units.

A good number of industries come under the scope of the definition ; but keeping in view the limited resources for ancillary development, only a few selected industrial products have been brought under the intensive assistance programme of the Small Scale Industries Development Organisation. These are :—

1. Industrial Machinery.
2. Agricultural and Earth Moving Machinery.
3. Industrial Scientific and Mathematical Instruments (Mechanical).
4. Locomotives, rolling stocks, ships and aircraft.
5. Bicycles.
6. Machine tools.
7. Boilers and steam generating plants.

8. Steam engines, turbines and internal combustion engines.
9. Automobiles.
10. Commercial, Office and household equipment.
11. Electrical Machinery, equipment and appliances.
12. Telecommunication equipment.
13. Industrial Instruments (Electrical).
14. Radios and electronic equipment.
15. Mineral oil and petroleum products.
16. Air conditioners and cold storage equipment including refrigerators.

Nature of Ancillary units—

(*a*) *Those which supply specific components for fixed periods on the basis of contracts—captive units.*—Small scale units manufacturing components or sub-assemblies to large scale units enter into contracts with the latter for regular supply of the products required by them according to the prescribed standards and specifications. Deliveries are to be made according to the schedules agreed upon between the main contractors and the sub-contractors. The necessary technical know-how is provided by the parent unit. Special tools, jigs, fixtures, etc. besides raw materials are also supplied, where necessary. Payments are made according to a pre-arranged system of assessment of the materials and time consumed. The entire production of the ancillary unit is consumed by the parent unit. Such ancillary units usually conglomerate near the parent unit and ancillary industrial estates have been set up for the purpose at some places.

(*b*) *Independent ancillary units* :—They are not tied upto the parent (main contracting. units so closely as the captive ancillary units. These units manufacture selected items for supply to one or more large scale units according to their specifications and drawings) They are at liberty to manufacture other items also besides the ancillaries for the main contractor. The units may have to arrange for the technical know-how and raw materials on their own if necessary.

(*c*) *Ancillaries for open market consumption.*—Some of the ancillary units manufacture entirely for replacement market. Units manufacturing automobile components fall under this category. The units do not get technical know-how and raw materials from the large scale units.

Progress of Ancillary Industries in India.

There are now about 10,000 small scale units manufacturing components, etc., required by large scale units. Some are located in industrial estates. Ancillary industrial estates have sprung up in the various States and the programme of setting up more such estates is gathering momentum.

About 200 large scale units obtain regularly supplies of the components, etc. required by them, from small scale ancillary units. The total investment in these small scale units is estimated at Rs. 300 crores and the ancillary supplies made by them during 1969–70 are estimated at Rs. 27·73 crores. The number of persons employed in these industries is about 100,000.

Ancillary industries in Tamil Nadu.

It can be claimed with reasonable pride that a vigorous and growing ancillary sector has been developed in Tamil Nadu, thanks to the progressive attitude adopted by the large scale units, the active official assistance to small-scale ancillary units as part of the ancillary development programme and the initiative and drive of the small-scale entrepreneurs. The setting up of public sector undertakings like the Integral Coach Factory, Madras, Bharat Heavy Electricals, Limited, Tiruchirappalli, etc., have acted as catalysts to the development of small-scale ancillary units. In fact, an ancillary industrial estate has been established to accommodate the ancillary units of Bharat Heavy Electricals, Limited.

There has been rapid growth of engineering and automobile industries in and around Madras. It has been roughly estimated that about 50 per cent of the value of production of all automobile ancillary industries is accounted for the units in the Madras area. It may be mentioned here that some of the ancillary units of the automobile industries in and around Madras are themselves large or medium-scale units which sub-contract numerous products like bolts, nuts, fasteners, coils, castings, etc. to a number of small-scale units. With the growing demand for various automobile and other products and the consequent expansion of the parent units, the ancillary units also expand their production as well as diversify the range of their products which generates new skills and capabilities. One healthy feature of small-scale ancillary units is that they have necessarily to be modern to keep in tune with the rapidly changing and varying requirements of the parent units.

Assistance programme for small-scale ancillary industries.

Besides the different types of assistance available from the various organisations connected with the small-scale industries, the small-scale ancillary units are entitled to special assistance relating to—

1. Allotment of sheds in industrial estates.

2. Credit facilities at concessional rates of interest.

3. Machinery on hire purchase basis.

4. Price preference up to a maximum of 15 per cent in favour of small-scale units in the Government Stores Purchase Programme.

5. Allotment of scarce raw materials, both indigenous and imported.

6. Technical assistance and training facilities from the Small Industries Service Institutes.

The Small Industries Service Institute, Madras, renders technical, economic information, managerial and training assistance to the ancillary units and maintains close liaison with the small scale units on the one hand and large-scale units and public sector undertakings on the other.

Besides this, the Institute organises exhibitions to project the image of the ancillary industries and to give wide publicity to their achievements. The various components, parts, etc., manufactured by the ancillary units are displayed at these exhibitions and contacts are estabilished between the small-scale entrepreneurs, large scale industrialists and others who visit the exhibitions.

The Institute organises also seminars in which various parties—industrialists as well as official agencies/departments interested in the development of ancillary industries participate and discuss and disseminate information on problems and prospects of ancillary industries.

Sub-contract Exchange.

A Sub-contract Exchange has been described as a " system for increasing industrial " efficiency by speeding the farming out of sub-contract work ".

With the increasing tempo of industrialisation and emphasis on specialisation, the need has been felt for some device to fill up the information gap between the requirements of large-scale sector and the capacities of the small-scale sector and collect, store and disseminate information systematically for linking the two. The Sub-contract Exchange performs this important role.

Two Sub-contract Exchanges have been set up in India with the assistance of UNIDO Expert, one at Madras and the other at Bombay as part of the Small Industries Service Institutes. The Exchange at Madras was set up in May 1970.

Tamil Nadu Sub-Contract Exchange, Small Industries Service Institute, Madras.

The Exchange serves as a Central Information Bureau where machine capacities of small-scale industries are registered and enquiries from large industries for the manufacture of different components, sub-assemblies and bought-out components such as hardware items manufactured are passed on to capable registered small scale units having spare capacity to undertake the manufacture of the requirements of large-scale units. The Exchange thus saves the time of large industries in searching for sub-contractors to carry out any type of work and also assist sub-contracting units to find jobs for their machines.

The various important functions undertaken by the Exchange are :—

1. To invite small-scale units dealing in mechanical, electrical, plastic, ceramics, leather industry, etc., to register their spare capacity of machinery with the Exchange and record on the information cards prepared machine-wise, process-wise and product-wise.

2. To approach large industries and request them to off-load items which could be manufactured in small-scale industries.

3. To render technical assistance to small-scale units in developing/manufacturing the items registered by large-scale industries.

4. To furnish information to small-scale industries regarding the requirements of large-scale industries.

Registering of small-scale units for spare capacity of their machines.

This consists of—

Collection of information regarding spare capacity of machines and items manufactured through correspondence;

visiting the units to verify their technical competence, the conditions of the machines installed and quality control available in the unit;

making final selection of units capable of handling the enquiries;

codifying the information relating to the selected units ; and

noting the change of capacity of machines or addition of machines based on the information supplied by the unit.

Processing the enquiries.

The enquiry is received by letter/on phone/on visit to the Exchange by the party.

The enquiry received by a letter/on phone is scrutinised and wherever necessar, correspondence is initiated with the units placing the enquiries for the supply of drawings for the items to be farmed out, for clarification regarding specifications of raw materials, quantity required and the date of delivery.

The selected units are then contacted and they are supplied particulars of the requirements of the main contractor.

Where drawings are involved, according to which the main contractor requires the parts/components to be manufactured, the selected small-scale units are invited to the Exchange to study the drawings and are given advice, in case any clarification is required.

After verifying the availability of spare capacity of machines, the details of the enquiry are sent to those small-scale units which show interest to take up the job, with the request to quote to the main contractor.

Follow-up action is taken through correspondence and personal visits till the main contractors get into touch with the sub-contractors.

Steps taken to popularise the Exchange.

To begin with, the Exchange confined itself to collecting information from small-units located in Madras city only. However, enlistment of units capable of undertaking sub-contract work from other districts has also commenced. Circulars have been senot to all the small-scale units in Tamil Nadu explaining the activities of the Sub-contract Exchange. So far, information has been collected from engineering units. This is being extended to a few other non-engineering industries also to enlarge the scope of the Exchange.

The exchange has already made an impact on some of the large industries. For example, the Bharat Heavy Electricals' Boiler Plant, Tiruchirappalli, has sub-contracted many of its requirements such as structures and ductings, machinery for flanges, floor grills, hand wheels, boiler and valve castings, etc. Besides, Madras Refineries are also planning in a big way to sub-contract their items. Defence authorities and Railways have also been approached to make full use of the Exchange and the enquiries from them have started flowing into the Exchange.

Large-scale industries like Lucas-TVS, Leyland, Best & Co., English Electric Co. and Tractros and Farm Equipment Co., sub-contract several items and the small-scale units supply the following ancillary components to the exacting standards of large-scale industries both in the public and private sectors:—

1. Ferrous and non-ferrous castings.
2. Brass forged items.
3. Jigs, fixtures, dies and tools.
4. Electrical items.
5. Precision turned components.
6. Steel forgings.
7. Springs.
8. Wiring harness.
9. Pressed components.
10. Automobile components.
11. Aluminium water tanks.
12. Battery boxes.
13. Door locks.
14. Luggage racks, etc.

The total value of order secured by small-scale units from large industries both private and public sector, including Rail ways and Defence, since 1958–59 till 1970–71 was Rs. 3,447 lakhs.

With the setting up of the steel plant at Salem and growth and development of petro-chemical complex in and around Madras (Manali) ancillary industries covering a wide range of items is bound to gather further momentum in years to come.